



**A Comparison Of The Air Force Institute Of
Technology And Civilian Institutions Graduate
Logistics Curricula**

Graduate Research Project

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AFIT/ILM/ENS/06-03

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Abstract

The changes in capabilities, philosophies and techniques being utilized in the private and public sectors will continue to make logistics curricula design a challenge. This research study utilized literature reviews to identify 8 competencies' required for mid-level logistics leaders to succeed now and in the future. Programs from ten academic institutions including AFIT and seven of the top 10 programs were compared by analyzing their coverage of the eight competencies. The research highlighted that all of the schools are teaching the majority of the competencies. The programs with MBAs provided a strong business foundation of supply chain management/logistics courses.

AFIT adequately addresses all of the competencies except globalization and Finance/Cost Control. These deficiencies can easily be corrected by making the International logistics course a core course and adding a Finance/Cost Control course. Taking a more interdisciplinary and inter-industry approach to the future competencies identified in this research will ensure students gain current, hands on education in the critical areas of Networking/computing, supply chain management and logistics operations.

Dedication

To our Wives, the true heroes in our lives

Acknowledgments

First and foremost we would like to thank our beautiful wives and children. Their sacrifices throughout this process and over the course of our entire military careers have been great. They have been the true warriors sacrificing so much so we could be the ones with the opportunities to develop ourselves and to travel across the globe.

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A Comparison Of The Air Force Institute Of Technology And Civilian Institutions Graduate Logistics Curricula

I. Introduction

Overview

The criticality and complexity of a logistics leader's role is being recognized in the private sector and within the Department of Defense (DoD). The private sector has recognized the importance of logistics by integrating the traditional logistic processes and traditional business functions (Stratton, 2003:1). Logistics leaders are no longer buried in the warehouse; they are an integral part of the executive team (Harps, 2003:1). Similarly the United States Air Force (USAF) combined logistics career fields into a single career field entitled Logistic Readiness Officer. This change better aligned the roles of military and civilian sector mid-level logistics leaders. One of the challenges facing civilian and military leadership is how to educate logistics leaders considering the breadth and depth of functions now encompassed in the logistics leader's span of control (Lynch, 1998:1). The changes in capabilities, philosophies and techniques being utilized in the industry and government will continue to make curricula design a challenge. This introductory chapter includes background information, the problem statement, research and investigative questions, methodology, assumptions/limitations and the significance of the study.

Background

The criticality of logistics in today's civilian and public environment is changing the scope of logistics and range of responsibilities for logistics leaders. The role of leadership in the traditional "logistics and supply chain management is the difference between the traditional role of supply chain and distribution -- that of being a necessary evil whose job is to just get the shipment out the door -- to becoming an integral part of the management team and the strategic direction of the company," according to Chuck Taylor, CEO and executive vice president of ServiceCraft Logistics (Harps, 2003:1).

This dramatic ascent from the warehouse floor to the board room has occurred because "logistics' central and relative roles coupled with its ability to identify and continuously work with inter and intradepartmental and inter and intradisciplinary relationships provides the opportunity for the Logistics Leader to stand out amongst other leaders," according to Keith Thurgood, Director, Strategic Sourcing, of Frito-Lay (2003:2). Secretary of the Air Force James G. Roche demonstrated his understanding of this shift when he spoke of the importance of logistics leaders. His comment that "We need well-educated, well-trained professionals to carry out our worldwide mission" drives home the point that the development of our logistics force is of the utmost importance to our future (U.S. Air Force Policy Letter Digest, 2004:2).

The scope of logistics has changed dramatically in the age of supply chain management. The private sector and Air Force recognized the utility of reducing stovepipe leadership within the logistics arena. According to Felecia Statton, Editor inboundlogistics.com, the civilian sector logistics industry "has transformed from a series of silo functions -- purchasing, transportation, logistics, customer relations -- into a collaborative discipline" (2003:1). A similar merger occurred in the Air Force with the consolidation of Supply, Transportation, Fuels and Logistics

Plans into a single organization known as the Logistics Readiness Squadron. To lead this new organization, the Air Force created an officer career field that combined multiple logistics career fields into a single career field entitled Logistic Readiness Officer. This new career field was a major step toward aligning the core roles of military and private sector mid-level logistics leader.

Leadership understands the need for quality logistics leaders and must now face the challenge of ensuring their availability for the future. Dr. Remko I. Van Hoek, a professor in supply chain management at the Cranfield School of Management, is one of many experts who believe the greatest challenge facing the logistics community is the ability of higher education institutions to deliver course curricula that covers the foundational competencies and rapidly changing concepts (2001:11). Similarly, a spokesman for the Air Force Personnel Center states that “the logistics career field is undergoing significant changes in the way an officer is educated, as well as developed, in the workplace” (Shirriff, 2003:2).

This paper will address two main issues. First we will seek to identify the competencies required for military and civilian mid-level logistics leaders to succeed now and in the future. Second we will compare how Air Force Institute of Technology (AFIT) and civilian institutions are addressing these competencies.

Problem Statement

The rapid change in the logistic strategies, technologies and research developments makes it difficult for educators to ensure their course curricula match the current requirements for mid-level logistics leaders. Air Force leadership needs to know how the logistics management graduate program curricula at AFIT compare to leading civilian institution’s supply chain management/logistics programs curricula. The lack of an industry accepted list of

competences required for logistics leaders to succeed now and in the future makes a comparison of current program difficult.

Research Questions

How are AFIT's logistics management graduate programs and leading civilian institutions programs addressing the competencies needed to meet current and future competencies for mid-level logistics leader?

Investigative Questions

1. What competencies are required by mid-level logistics leaders?
2. What are the curricula for the AFIT graduate logistics management programs?
3. What are the curricula for the leading civilian institution's graduate logistics management programs?
4. How does AFIT's Logistics Management programs and the civilian institutions compare to the competencies?

Methodology

The research will answer the first investigative questions by clustering the competencies required now and in the future for mid level logistic leaders as identified by logistics leaders and researchers.

The research will answer investigative questions two and three through the collection of course titles and course descriptions covering the 2005-2006 academic school years for AFIT and civilian institutions graduate supply chain/logistic programs.

The research will answer investigative question four with a comparison of AFIT and civilian institution's graduate logistic programs to competencies needed by mid-level logistics leaders.

Assumptions/Limitations/Definitions

The research will focus on the competencies required of a mid-level logistics leaders and how well the AFIT and civilian institutions address these competencies in their curricula given the following limitations and assumptions.

1. The research will consider the AFIT 12 and 18 month logistics management graduate degrees with the understanding that these degrees offer differing levels of requirements in course curricula and documentation.
2. The research will consider civilian institutions that are located within the United States and whose program was ranked in the top 10 supply chain management graduate programs as reported by U.S. News and World Reports *America's Best Graduate Schools* for 2005. U.S. News and World Report's rankings were based on inputs from business schools across America. Also, due to the proximity of Wright State University and the uniqueness of North Dakota State University's supply chain management/logistics programs they were included. Both of these programs are non-MBA programs and are similar to AFIT's Logistics Management degree. The North Dakota States program is more flavored with a military focus than any program in this research.
3. Only the 2005-2006 Graduate course catalogs will be used. This limitation is due to the time necessary to conduct and complete the research. The authors wanted a snap shot of what is currently being taught at each institution rather than what has been or could be taught. Also, time constraints in completing this project limited the scope of research.
4. The research will attempt to categorize each course by course title and description. Although we believe some categorization can be successfully completed, there is no

guarantee that each like course is truly alike. Each institution and professor brings their own slant on what and how items are presented and subjects can be dispersed into several different courses rather than having a course solely designed for it.

The following definitions will be utilized throughout the research documentation:

- a. Mid-level Logistics Leader: Air Force Logistics Officer in the rank of Captain to Major including 21A and 21R career fields and DoD civilian equivalents. The private sector has a much more varied set of titles but for this research the mid-level leader will range from division director to sub executive level.
- b. Leader, manager, professional: This document will utilize leader, manager and professional interchangeably. We understand that there is significant debate as to their differences but due to the varying sources being studied there is a need to make them interchangeable for this research project.
- c. Competencies: “A cluster of knowledge, skills, and attitudes that can result in leader excellence, regardless of position industry, or geography that can be measured and improved through training development.” (Hirzel, 2002).

Significance of this Study

This study has significance in both the Air Force and civilian logistics and educational settings because it provides an insight into how their programs compare to a set of competencies defined by civilian and military leaders.

Summary

Background information was presented concerning the dramatic changes in the logistics industry and how the expansion of the logistics leader’s scope of responsibilities resulted in a new set of competencies. The problem statement expounded on how the rapid change in the

logistic strategies, technologies and research developments makes it difficult for educators to ensure their course curricula match changing requirements. This study's purpose is to provide Air Force leadership insight into how the logistics management graduate programs curricula at AFIT compares to leading civilian institution's programs based on how they are addressing the competencies required for mid-level logistics leaders to succeed now and in the future. This research will utilize literature reviews to develop a set of logistics leader's competencies. AFIT and civilian institutions curricula will be compared based on their coverage of the competencies identified in the research.

II. Literature Review

Overview

This chapter lays the groundwork for the research of the comparison of AFIT's and civilian institution's supply chain management/logistics education at the graduate level. This chapter will include a review of the changes in the logistics community, changes in the scope of the responsibility of the logistics leader, changes in the skills required for logistics leaders, the nature of education from its origin to the purpose of a graduate education and the trends in supply chain management/logistics education.

Changes in the logistics community

In the last 40 plus years we have seen the migration of the distribution focused area to the logistics field of today that includes a large breadth of processes, skills, knowledge and technology. The field of logistics really began to expand and become a legitimate, refined functional area with the founding of the National Council of Physical Distribution Management in 1963 and the integration of functional areas including inventory management, materiel handling, order processing, and warehousing becoming linked with the standard functional areas (Lynch, 1998:1).

The 1970s brought a historic first to the board room when senior leaders saw for the first time how rising distribution costs can have a detrimental affect on the bottom line across business sectors. Equally dramatic was the deregulation of the transportation industry providing customers the opportunity to seek competitive advantages and suppliers to compete in a free-market environment for the first time in 100 years (Lynch, 1998:2).

The dark side of the new freedom provided by deregulation showed itself in the inability of the industry to find a universal foundation upon which to build. Without a solid structure to operate within, the industry suffered through dramatic shifts. For example, the Staggers Act keyed a new era for railroads but resulted in a drop in Return on Investment (ROI) from a 25 year high of 4.3 percent to only 2.2 percent in a mere two years of open competition (Lynch, 1998:1). Similarly, motor carrier deregulation caused an influx of new providers creating a “predatory competition” environment that was detrimental to the entire industry (Lynch, 1998:2).

According to Lynch, the 1980s brought the end to “100 years of outmoded and often inequitably applied laws, the nation's carriers were at last free to operate in a free-market environment. They were free to be creative and innovative. Most importantly, their customers were free to behave competitively” (Lynch, 1998:1). Mergers to include rail, steamship lines and energy companies, helped stabilize the industry resulting in the ROI steadily climbing to 8 percent (Lynch, 1998:2). Though the number of motor carriers continued to grow over the 1980’s -1990’s from 18,000 to over 40,000 today, there was almost a complete shift as over 50% of the companies changed ownership (Lynch, 1998:2). The new freedom provided opportunity for both the providers and their customers but failed to stabilize the industry. Lynch believes this instability had a positive affect:

free-market, free-thinking, competitive atmosphere, the increased access to the personal computer and related software, and the way was paved for a new and exciting era in the field of logistics-without question, the most exciting period since its modern genesis in 1962 (Lynch, 1998:2)

Changes in the scope of responsibility of the logistics professional

Changes in the scope of responsibility of the logistics professional ran parallel with the sweeping changes in the industry over the last 40 years. Changes in the logistics environment

resulted in a shift away from the standard stovepipes responsibilities of logistics leaders in the past. Felica Stratton, Editor of Inboundlogistics.com, believes

our industry has transformed from a series of silo functions -- purchasing, transportation, logistics, customer relations -- into a collaborative discipline. This new interoperability of our discipline -- bringing together these merging perspectives and definitions -- creates confusion, which can only be resolved through continuing education (Stratton, 2003:1)

Today's logistics leaders are unique in their scope of responsibility and requirement to operate across organizational boundaries both internally and externally. In most organizations, the breadth of processes within the control of a logistics leaders and depth of expertise is extraordinary. Donald J. Bowersox, The John H. McConnell University Professor at the Eli Broad Graduate School of Management at Michigan State University and his colleagues found that

effective management of the logistics process ... is complicated by the fact that over 90% of all logistical work takes place outside of the vision of any supervisor. No other employees within the typical business enterprise are expected to do so much critical work without direct supervision as those that make logistics happen (Bowersox and others, 2000:11)

The lack of direct supervision of internal logistical systems is just one portion of the modern logistic leader's responsibilities which include equally critical process that occur outside their organizations boundaries.

Maria McIntyre, executive director of the Council of Logistics Management understands that "Logistics professionals work across functions within the organization, with business units throughout the company, and with partners across the supply chain" (Harps, 2003:1). McIntyre believes current logistics professionals must have exceptional leadership abilities to handle "collaborating with trading partners and developing innovative solutions to optimize logistics and supply chain strategy and operations" (Harps, 2003:1). Strong leadership abilities as indicated by McIntyre are critical but so are an abundance of varied skills.

“Current logisticians are faced with a much different business environment than a decade ago. In the case of logistics, managers should possess a wide range of skills to be successful” (Chen and others, 2004:1).

Changes in the skills required for logistics leaders

Changes in the industry and scope of responsibilities of a logistics leader resulted in a change in the expertise and skills required for logistics professionals. Dr. Matthew B. Myers, an Assistant Professor in the Department of Marketing, Logistics, and Transportation at the University of Tennessee believes:

Logistics managers will need knowledge-based technical competence, cross-functional experience, collaborative interpersonal skills, and self-management skills to manage logistics organizations in the future (Myers, 2004:4).

Similarly Susan I. Scott, ISM's Certification Committee Chair believes a fully qualified logistics leader will be required to demonstrate efficiency in multidimensional roles including strategic sourcing, commodity and logistics management and diversified supplier relationships (Supply and Demand-Chain Executive Editorial staff, 2006:1).

Brita Gammelgard cannot make it any clearer than when she wrote “Logistics managers need a new skill set” (2001:1). She reinforced her idea with the research of Sheffi, Yossi and Peter Klaus (1997), who insisted that "the skills required by a modern logistician are no longer restricted to the understanding of how to operate a warehouse or how to reduce the rate per mile charged on a particular lane" (Gammelgaard, 2001:1). This broad statement seems to be easily understood and assumable but indicates a dramatic change in the skill set required for logistics leaders that is parallel to the shift of the importance and scope of logistics in the business arena. Sheffi, Yossi and Klaus go on to discuss the concept that as the scope changed, the skill set began to require logisticians who are capable of setting up current supply chains that can handle

the current logistical requirements but additionally be capable of changing and adapting to new situations and unknown future situations (Gammelgaard, 2001:3).

Though a general set of skills required for a logistics leaders to handle today's environment is not readily available, leaders do agree that there has been a substantial change in the industry. The complexity of the logistics systems of today requires a more talented and educated logistics leader. Sheffi, Yossi and Klaus believed this new environment will "require a higher degree of managerial talent than basic operational service" because today's skills requirements are more "situation-special, and therefore more difficult to find or cultivate in the short run" (Gammelgaard, 2001:1).

As the industry has transformed over the last 40 years, so have the leadership skills required to be a logistics leader. In their Industry Forecast 1999, Material Management and Distribution, Ken Mark and Lisa Young projected that supply chain management, outsourcing and information technology is not only changing the way logistics is being utilized but how it is being taught (1998:17).

In the past, the logistics community reacted to changes rather than preparing for and controlling the changes to better the industry and the customer. To capitalize on change rather than reacting logistics leaders must be provided the skills required through continuing education as suggested by Stratton (Stratton, 2003:1).

The nature of education

Education comes from the Latin word *educare*, which means "to raise up" or "to train". Its general purpose is to "impart knowledge." When did education start? Education started sometime between 3000 and 500 B.C. in Egypt (Education, 2006). As cultures evolved there was a need of "educating" society on the daily aspects of life. These daily aspects ranged from

skills of communication, commerce, religion and survival. According to Dieter Lenzen, the president of Freie Universitat Berlin, “education began either millions of years ago or at the end of the 1770” (Education, 2006). It’s noted that the first chair of pedagogy at the University of Halle, Germany, was founded at the end of the 1770. From this we can glean education has been an integral part of our world for a centurion. Education evolved into a more formal process and institution in Europe (Education, 2006).

The American system of formal education or the awarding of academic degrees can trace its origins back to the thirteenth century. This practice started at the Universities of Bologna and Paris and finds its roots in Roman law. During this time trades and professions could form *collegiums* (Spurr, 1970:9). According to Webster’s online, a collegium is “a group in which each member has approximately equal power and authority” (Collegium, 2006). These groups eventually began to congregate in Bologna and Paris. The groups in Bologna studied law and the teachers were called doctors. In Paris, the predominate area of study was the arts and its faculty were called masters (teachers). Students who had met the necessary requirements were given the title of doctor or master and as such were part of the respective guild of teachers. It’s interesting to note that Pope Gregory IX declared a papal bull in 1233 that gave all individuals with the title of doctor or master the ability to teach at any university without having to pass additional requirements. Overtime these titles were diluted from a personal title to a degree title (Spurr, 1970:9-11).

In America, the awarding of Master’s degrees started in mid-1600s at Harvard College. This was conferred upon a student upon completion of one to three years of additional work beyond the bachelor degree. Overtime however the degree turned into a paid privilege and ceased to be awarded for achievement. This practice changed in the late 1800s when reforms

took place within academia (Council of Graduate Schools, 1994:2). In 1859, the University of Michigan awarded the first master's degrees since the reformation of the degree (Spurr, 1970:13).

John Passmore outlined three purposes of providing a graduate education during the 1978 International Conference on the Philosophy of Graduate Education held at the University of Michigan.

1. To train graduate students in the conduct of research, thereby stimulating critical and creative thinking on questions of fundamental importance, and, by so doing, to throw light on the problems of contemporary society:
2. To provide such training at the graduate level as will meet the perceived needs of the community whether short-term or long-term;
3. To contribute to the general pool of scholarship and discovery (Passmore, 1978:40)

A more recent look at the purpose of a Master's degree comes from the Task Force on the Graduate and Postbaccalaureate Education in the CSU (California State University). Their report published in September of 2004 states:

Postbaccalaureate education provides students with highly specialized tools, content, and developed capabilities for greater depth of exploration, and understanding. In hundreds of academic fields, degrees and courses enable students to progress further in fields of interest and employment, enabling them to become licensed or qualified in a variety of applied areas. They also provide students with skills and understandings to become more effective mentors, entrepreneurs, and practitioners. These programs enable students to advance, to gain greater salary, and have a stronger impact on all sectors of California's society (Rethinking Graduate....21st Century, 2004:19)

From the CSU Task Force review one gets a sense of contribution to society by the graduate student and a benefit both intrinsically and monetary from graduating from a graduate level program. The task force further recognized the professional Master of Science degree as becoming a degree that is growing in advanced-level workforce development. And as such,

graduate programs should partner with business and professional organizations to design even better programs in the future (Rethinking Graduate....21st Century, 2004:6).

Master's degrees fall into two categories: research oriented and professional oriented. According to the Council of Graduate Schools policy statement in 1994, 85 percent of the master degrees awarded fall into the latter category (Council of Graduate Schools, 1994:4). The Council stated that students that graduate with a Master's degree should have the following abilities:

Think logically and consistently; integrate and synthesize knowledge; understand how to access knowledge and information within the discipline; write in a clear, consistent and logical manner; understand the interrelationships between their discipline and others; be aware of and know how to deal with ethical dilemmas within their profession; and apply their knowledge about the discipline to real-life situations. (Council of Graduate Schools, 1994:4)

Along with the abilities listed above, the Council discusses from where the abilities should come:

At the master's level, a graduate is expected to have gained knowledge and skills which come from not only coursework, research, and practica required in the program, but also from the varied experiences and perspectives brought to the program and shared by the students and faculty. (Council of Graduate Schools, 1994:4)

The Council discussed how this program should be tied together by a culminating experience.

The program should culminate in an opportunity for students to integrate their graduate experiences and knowledge. A thesis or equally rigorous creative project, or a demanding comprehensive examination, can provide an appropriate experience. Since the ability to communicate in one's field is essential, all master's programs should include an opportunity for the student to learn to present scholarly information in written and oral form to a variety of audiences. (Council of Graduate Schools, 1994:5)

From the Council's statements one can infer that a master's degree should be one that is both rigorous and thought provoking.

The table below shows the growth in the number of Master's degrees awarded.

Table 1. Graduate Degrees Award by Year in the United States

Earned degrees conferred by degree-granting institutions: Selected years, 1869-70 to 2013-14			
Master's degrees			
Year	Total	Year	Total
1899-1900	1583	2000-01	468476
1909-10	2113	2001-02	482118
1919-20	4279	2002-03	512645
1929-30	14969	2003-04\5\ ...	531000
1939-40	26731	2004-05\5\ ...	562000
1949-50	58183	2005-06\5\ ...	580000
1959-60	74435	2006-07\5\ ...	596000
1969-70	208291	2007-08\5\ ...	615000
1979-80	298081	2008-09\5\ ...	634000
1989-90	324301	2009-10\5\ ...	650000
1999-2000	457056		
SOURCE: U.S. Department of Education, National Center for Education Statistics, Earned Degrees Conferred http://nces.ed.gov/programs/digest/d04/tables/dt04_247.asp			

Graduate students have gone from pursuing vocations in academia to those in all types of vocations. The table above shows the rapid increase in master degrees conferred on students. In 1980, almost 300,000 degrees were awarded and in twenty-two years this increased to over half a million degrees per year. This rise supports the CSU Task Force's opinion that degrees are becoming in high demand by professionals trying to stay abreast of new emerging education in their respective fields (Rethinking Graduate....21st Century, 2004:iii). "One of the major challenges to management in the next decade is the scarcity of trained supply chain managers. To meet these challenges, substantial change in logistics and supply chain education is necessary" (Closs, 2000:i).

The trends in supply chain management/logistics education

The trends in supply chain management/logistics education will be explored in the final section of this literature review. Professionals in supply chain management/logistics require

education on new emerging trends in their fields. According to Kathleen Hickey, “Education never ends, especially in the fields of logistics and supply chain management. Concepts and practices evolve continually, forcing logistics professionals at all levels to polish their knowledge to keep up with the times and advance their careers” (2003:1). As such there has been a rapid growth in logistics programs across the country at both the undergraduate and graduate levels. The interesting item of note is the structure of the different programs across America. Some universities have chosen to place the logistics program within other existing departments whereas others have created stand alone departments. The core issue that seems to determine this is whether or not logistics is a vertical discipline or is inter-disciplinary (Lancioni, 2001:53). This can be seen in types of programs that fall within U.S. News and World Reports top ten supply chain management/logistics programs in the United States for 2005. The vertical programs would encompass the MBA programs, whereas the others would be more inter-disciplinary. The inter-disciplinary programs are stand alone departs that utilize the expertise of other departments to instruct the areas that are not supply chain management/logistics unique.

Table 2. 2005 Top Ten Supply Chain Management/Logistics Programs

Top Ten Supply Chain Management/Logistics Programs in the United States		
Ranking	School	Type Degree
1	Massachusetts Institue of Technology (Sloan)	MEng
2	Michigan State University (Broad)	MS
3	Carnegie Mellon	MBA
3	Stanford University	MBA
5	University of Pennsylvania (Wharton)	MBA
6	Ohio State University (Fisher)	MBA
6	Purdue University (Krannert)	MBA
8	Arizona State University (W.P. Carey)	MBA
9	Penn State University (Smeal)	MBA
9	University of Michigan	MBA

Source: US News and World Report America's Best Graduate Schools (2005)

The majority of programs are Masters of Business Administration with Supply Chain Management/Logistics specializations. The other ones noted are Masters' Degrees in Engineering, Science or even more specialized as the U.S. Army's joint effort with North Dakota State University providing a Masters of Military Logistics. Either way, Richard Lacioni and others have surmised although the type of structure is important there are other internal and external facets that universities should review. The internal issues are:

- (1) To encourage college and university administrations to support the creation of logistics/supply chain programs
- (2) To develop partnerships with other academic departments to facilitate the creation of cross-disciplinary logistics courses
- (3) To develop multi-industry partnerships to be informed as to what the changing educational needs of industry are to insure that their logistics programs remain current
- (4) Finally, it will require significant internal efforts to develop. (Lacioni, 2001:53)

The external factors Lacioni and others outline are:

- (1) To seek industry partners to fund the creation of logistics centers in colleges and universities.
- (2) To develop a reliable resource base that enables a college or university to offer cross-disciplinary based logistics courses.
- (3) To develop external funding in the form of government and industry grants to support logistics education programs.
- (4) To recruit and hire logistics faculty that are interested in developing cross-disciplinary pedagogical approaches to logistics education.
- (5) To work with professional associations like the CLM, SOLE, AST&M American Marketing Association, Academy of Management and others to foster inter-industry academic partnerships.
- (6) To develop intern and extern opportunities for students in industry. (Lacioni, 2001:53)

These internal and external factors are crucial to the success of a program. This includes both inter-disciplinary approach and an inter-industry approach that shares the financial burdens, information and promotes collaboration that fosters the promulgation of the logistics profession.

With quality programs, businesses and logistics professionals will seek out education that will better position them in an ever changing business environment. The question might arise is education worth the investment. According to *World Trade*, “there’s one investment that’s pretty much without reproach—education.” Even in a poor business climate education is still a must. It provides value to the company and the edge in a competitive environment (Using your smarts: investing in logistics education is a no-brainer, 2003).

Theodor P. Stank, The John H. Dove Distinguished Professor of Logistics at the University of Tennessee, wrote that many in the industry believe “that higher business education is breaking down, that the system is churning out irrelevant academic research and training students to be theoretical managers incapable of taking responsibility for the performance of others” (2004:1).

Others in the logistics industry including Dr. Remko L Van Hoek, believe that it is not the education system that has changed but that logistics education is a challenge because the “increasing internationalization of business enabled by the evolution of ICT and transport technologies, the further evolution of content from a separate discipline, in some cases within the marketing area, with basic activities such as transport policy and warehouse design, to an integral contributor to competitiveness at a strategic level, and the development of research capabilities within logistics beyond the traditional operations research and mathematical tools for traditional capabilities such as transport network design and warehouse system development” (2001:2).

Lynch captures the one area that almost every expert found in this literature review agrees upon is that the challenge for the future centers on the need for logistics leaders with a broad spectrum of skills and the ability to adapt their talents and leadership styles at the same pace as the logistics career field. Further evidence of this concern across the logistics community can be found with the comments from Chen and others who say “One of the most critical challenges facing the logistics professionals during the 2000s will be the need to meet the skill requirements in logistics for the various levels of management. The shortage of specific assessment requirements and academic training in the area of logistics management has been a major concern for logistics executives and the logistics educators” (2004:1).

Summary

This chapter defined the groundwork for the research of the comparison of AFIT’s and civilian supply chain management/logistics education at the graduate level. This includes a review of the changes in the logistics community that saw logistics transform from a stovepiped, internally focused discipline that was readily ignored by organizational leadership into a collaborative, multi-functional discipline resulting in logistics leaders gaining access to the board room because of its importance to the bottom line. The literature showed these changes in the environment have also driven changes to the expertise and skills required for logistics professionals. Today’s logistics professional must have technical knowledge across multiple fields, communication skills that enhance customer and supplier relations and the ability to adapt to new technology and the global growth of logistics. The nature of education, from its origins to the purpose of a graduate education, were explored and found that graduates degrees have gone through a cyclical process resulting in today’s environment where master’s degrees have gone from sought out by those within the academia vocations to those in all types of vocations.

Finally, the trends in supply chain management/logistics education are changing rapidly resulting in logistics educators and professionals being concerned that the greatest challenge for the 2000s will be adapting the academic environment to match the growth of the logistics discipline.

III. Methodology

Overview

This chapter will provide an outline of the methodology used for development of a list of competencies required for mid level logistics leaders and their relationship to military and civilian supply chain management/logistics education at the graduate level. The methodology provides a description of the research paradigm, theoretical model, and three phases of the methodology/experimental design.

Research Paradigm

The research will answer the first investigative question, what competencies are required for mid-level logistics leader by combining the skills and academic subjects found during a review of logistics literature into competencies that encompass the current and future requirements for mid-level logistics leaders.

The research will answer investigative questions two and three, what are the curricula for the AFIT graduate logistics management programs and leading civilian graduate logistics management programs, through the collection of course titles and course descriptions covering the 2005-2006 academic school year for AFIT and civilian institutions. Course descriptions were taken verbatim from the respective institutions to maintain validity of the courses. These course descriptions are located at appendices A through L.

The research will answer investigative question four, how does AFIT's Logistics Management programs and the civilian institutions compare to the competencies, with a comparison of the military and civilian graduate logistic curricula at the course level to the competencies identified earlier in the research. This comparison will use the course titles and descriptions to categorize each course into one of the competencies identified through the literature review. The leading schools were picked by using the *2005 U.S. News and World*

Reports Best Graduate Schools in America Guide. These programs were chosen by surveys answered by graduate schools across the country. They were ranked based on the perceptions of other schools with similar programs.

Sample

Fourteen schools were selected to participate in the curricula comparison:

Table 3. Selected Supply Chain Management/Logistics Programs

Selected Supply Chain Management/Logistics Programs		
Ranking	School	Type Degree
1	Massachusetts Institute of Technology (Sloan)	MEng
2	Michigan State University (Broad)	MS
3	Carnegie Mellon	MBA
3	Stanford University	MBA
5	University of Pennsylvania (Wharton)	MBA
6	Ohio State University (Fisher)	MBA
6	Purdue University (Krannert)	MBA
8	Arizona State University (W.P. Carey)	MBA
9	Penn State University (Smeal)	MBA
9	University of Michigan	MBA
Source: US News and World Report America's Best Graduate Schools (2005)		
Other Schools		
	AFIT 18 Month Logistics Mgmt	MS
	AFIT IDE Logistics Mgmt	MLM
	Wright State University	MS
	US Army -North Dakota State University	MML (Masters of Military Logistics)

Methodology/Experimental Design

Phase I will seek to answer the first investigative question by combining the skills and academic subjects found during a review of logistics literature into competencies that encompass the current and future requirements for mid-level logistics leader.

Data Collection: Data in the form of skills and academic subjects will be pulled from a review of current leaders and researchers logistics literature.

Data Analysis: The skills and academic subjects pulled from a review of current leaders and researchers logistics literature will be analyzed to find trends that can be condensed into general competencies.

Phase II will seek to answer the second and third investigative questions through the collection course titles and course descriptions covering the 2005-2006 academic school year for AFIT and civilian institutions graduate supply chain/logistic programs. The objective of Phase II will be to gather sufficient data on courses taught in the top supply chain management graduate programs in the United States and for the Air Force Institute of Technology's Logistics Management Graduate degrees. The research will identify courses with detailed descriptions allowing the researchers to assign a course to a competency identified through the literature review.

Data Collection: Data will come from the top supply chain/logistics management graduate degree program catalogs and the AFIT catalog.

Data Analysis: The data for investigation questions two and three will be analyzed for any description patterns to ensure equivalencies are identified.

Phase III will seek to answer the fourth investigative question utilizing a course level comparison. The objective of Phase III will be to utilize the competencies as a framework for comparing the academic institutions. Each institution's curriculum gathered in Phase II will be compared to competencies.

Data Collection and analysis: Course level comparison will be compiled to determine if each school covers the competencies identified in Phase I.

Summary

The Methodology includes an initial investigation of the current logistics leadership and researcher's opinions on what skills and academic subjects are important to mid-level logistics leaders now and in the future. These skills and subjects are then analyzed to identify competencies. After the competencies are identified then the individual supply chain/logistics programs are compared to these competencies. This will result in a comparison of which universities are meeting the competencies for today and the future.

IV. Results and Analysis

Overview

Phase I sought to answer the first investigative question by clustering the skills and academic subjects found during a review of logistics literature into competencies that encompass the current and future requirements for mid-level logistics leader.

Question 1: What competencies are required by mid-level logistics leaders?

The following are the results of a comprehensive literature review that explored the skills and academic subjects identified by logistics experts and researchers in an attempt to develop competencies that can be addressed by the academic community. Appendix M provides a short description of the skills and academic subjects identified by logistics experts and researchers that were condensed into eight competencies. The following table illustrates the skills and academic subjects identified by the authors in the research that were incorporated into the eight competencies.

Table 4. Competencies Comparisons

Competencies	Authors											
	Chen & others	Van Hoek & others	Lynch	La france & others	O'Malley	Sohal	Johnson & Pyke	Poist & others	Managing Logistics	Mentzer	Trunick	Solseth
Networking/ Computing	X	X	X	X	X	X	X	X	X		X	X
Globalization	X	X	X				X	X				
Finance/Cost Control	X				X	X				X		
Planning/ Evaluation	X		X	X	X			X				
Logistic Center Operation	X	X	X	X	X	X	X	X	X	X	X	
Supply Chain Mgt		X					X	X	X	X		X
Quantitative analysis	X				X		X	X				X
Business Skills			X	X		X	X	X		X		
X=Required												

Logistic Center Operation: This competency is a compilation of all the standard logistic skills to include production control, inventory control, international transportation, logistics industry analysis, logistics facility planning, location optimization, reverse logistics, sourcing and supplier management. The logistics center operation skills fall clearly in the basic level of knowledge (Chen and others, 2000:1201) as the foundation for all levels of logistics leadership. Eleven of the twelve authors list this competency as a requirement for current logistics leaders and five felt that it was critical for future leaders.

Networking/Computing: This competency includes the technology utilized in logistics to allow cross-functional visibility of the assets, enhance customer and supplier communication, and strengthen the supply chain linkage. Lt Col Solseth captured this area well when he wrote “The technological area of competence includes the capability to use the software, hardware and web based technological tools that enable an effective and efficient distribution and supply chain management system. It includes some understanding of the communications requirements for a distribution system, which may include the bandwidth required to pass data that enables the system via various communications means, or the requirements of Automated Identification Technology (AIT), such as radio frequency identification tags” (2004: 28). Eleven of the twelve authors list this competency as a requirement for current logistics leaders and seven felt that it was critical for future leaders.

Globalization of transport and logistics: This competency includes the growing need to be able to handle global logistics. Each author has their own title or spin to include international trading, foreign language proficiency, global market entry but Dr. Remko L Van Hoek explains this competency very well. “The downward trend in transportation costs has spearheaded the development of global logistics flows and the flourishing of a logistics service industry. This

suggests a content challenge to teaching: from basic transport to international logistics and logistics services” (2001:2). Five of the twelve authors list this competency as a requirement for current logistics leaders and two felt that it was critical for future leaders.

Planning/Evaluation: This competency includes forecasting ability, logistics performance analysis, quality management, core competency development, outsourcing and strategic alliances. “Overall, it appears that the respondents are indicating the importance of being a manager first and a functional/technical specialist second. In other words, the results illustrate the importance of placing primary emphasis on acquiring general managerial skills (e.g. communication, leadership, interpersonal relations, as well as planning and control) and a secondary emphasis on functional skills such as logistics or marketing. This is consistent with the perspective of US respondents who see an increase in the importance of adaptability/flexibility, management skills involving planning and control” (Poist and others, 2000:10, 15). Five of the twelve authors list this competency as a requirement for current logistics leaders and three felt that it was critical for future leaders.

Supply Chain Management: This competency includes the ability to manage all aspects of a supply chain using the Council of Supply Chain Management Professionals definition of supply chain, “the material and informational interchanges in the logistical process stretching from acquisition of raw materials to delivery of finished products to the end user. (Council of Supply Chain Management Professionals, 2005:97). Johnson and Pyke point out that “Supply chain management is an enormous topic covering multiple disciplines and employing many quantitative and qualitative tools. Since integration is an overriding theme in supply chain, many different functional areas are addressed within a single course” (2000:2). Six of the twelve

authors list this competency as a requirement for current logistics leaders and all six felt that is was critical for future leaders.

Quantitative analysis: This competency includes statistics, mathematics, and quantitative analysis. Quantitative analysis uses a quantitative approach to decision making according to Barry Render and fellow authors of *Quantitative Analysis for Management* (2002:1). Poist and others highlighted that “US respondents see an increase in importance in technological literacy and quantitative skills” (2000:15). Quantitative analysis is one of the core areas of concentration for the basic level. (Chen and others, 2000:19). Five of the twelve authors list this competency as a requirement for current logistics leaders and two felt that is was critical for future leaders.

Business Skills: This competency includes a wide variety of skills. Trent Applied Social Research found that their respondents found human resource management, business ethics, general business administration, and information systems to be the most important business skills (Lafrance, 2005:109). Dr. John T. Mentzer believes business skills include “the traditional business functions of finance, marketing, production, accounting, sales and procurement” (2006:1). Six of the twelve authors list this competency as a requirement for current logistics leaders and one felt that is was critical for future leaders.

Finance/Cost Control: This competency includes being familiar with financial reports, statements, financial planning, cost control, cost analysis, and basic cost accounting. Sohol and D’netto’s survey respondents indicated that Accounting and Finance was an area not well covered in education and required additional training (2004:12). Four of the twelve authors list this competency as a requirement for current logistics leaders and one felt that is was critical for future leaders.

There is an important subset of the competencies identified in this study; those competencies felt to be important not only now but in the future. Network/computing, supply chain management, logistics center operations, planning/evaluation, quantitative analysis, globalization, business skills and finance cost control were identified by at least one author as being critical for future logistics leaders. This research found that Networking/Computing, Supply Chain Management, and Logistics Center Operation Skills were almost universally accepted key competencies for logistics leaders in the future.

Phase II sought to answer the second and third investigative questions through the collection course titles and course descriptions covering the 2005-2006 academic school year for AFIT and civilian institutions graduate supply chain/logistic programs. The second investigative question, what are the curricula for the AFIT graduate logistics management programs, was answered utilizing the course sequence for AFIT's Masters of Science in Logistics Management (07M-09M – Operational Logistics) and AFIT's Masters of Logistics Management (06-07). The curricula for the AFIT graduate logistics management programs are in Appendix A and B.

The third investigative question, what are the curricula for the leading civilian institution's graduate logistics management programs was answered by obtaining the program and course descriptions from the individual schools. For this study, leading civilian institution graduate schools includes the *U.S. News and World Report* Top 10 Supply Chain Management/Logistics MBAs and schools similar to AFIT including Wright State University and North Dakota State University's joint program with the U.S. Army. Unfortunately, despite numerous attempts, information on three of the top 10 programs, Carnegie Mellon University, Stanford University, and the University of Michigan was not available. The researchers understand that the U.S. News and World Report listed the top Supply Chain

Management/Logistics MBAs but the programs included have varying concentrations. For instance, MIT offers a Masters of Engineering in Logistics and MSU offers a Masters of Science in Logistics. The researchers concluded that MIT does not offer a MBA in Supply Chain Management/Logistics and that MSU offers both a MBA with Supply Chain concentration and a Masters of Science in Logistics. Both the MBA and MS at MSU are in the same school, the Eli Broad Graduate School of Management. As such, we chose to pick MSU's MS in Logistics Management, the program most like AFIT's MS in Logistics Management. The curricula from the leading civilian graduate logistics programs (listed in order of ranking) are located at Appendix C - L.

Phase III answers the fourth investigative question, how does AFIT's Logistics Management programs and the civilian institutions compare to the competencies, by comparing each university's program offerings against the competencies. Table 5 allows the fourth investigative question to be answered at the macro level.

Table 5. Curriculum comparison of schools matrix

Competencies	School, Type of Degree										
	MIT, MEng Log	MSU, MS Log Mgmt	U of Penn, MBA Ops Mgmt	OSU, MBA Ops & Log Mgmt	Purdue, MBA Global SCM	ASU, MBA SCM	PSU, MBA SCM	WSU, MBA SCM	NDSU, MML	AFIT MS, Log Mgmt	AFIT IDE, MLM
Networking/ Computing	X	X	X	X	X	X	X	X	X	X	X
Globalization	X	X	X	X	X	X	X	X	X		
Finance/Cost Control	X		X	X	X	X	X				
Logistic Center Operations	X	X	X	X	X	X	X	X	X	X	X
Planning/Evaluation	X	X	X	X	X	X	X	X	X	X	X
Supply Chain Management	X	X	X	X	X	X	X	X	X	X	X
Quantitative analysis	X	X	X	X	X	X	X			X	X
Business Skills	X	X	X	X		X	X	X		X	X

Table 5 shows the compilation of Phase II and III and answers Phase IV by demonstrating which competencies are covered by each program. The only programs with deficiencies are the non-MBA programs. The deficiencies are in Finance/Cost Control,

Quantitative Analysis, and Business Skills. These subjects tend to be more Management/Business centric. Thus the programs with a perceived deficiency could have made a program level decision to stress other areas. MSU was not teaching Finance/Cost Control, Purdue doesn't teach Business skills, WSU doesn't teach Finance/Cost Control and Quantitative analysis, and NDSU doesn't address Finance/Cost Control, Quantitative analysis, and Business Skills. Although the university's programs may discuss the subjects in the competencies, there didn't seem to be a concentrated effort on addressing these subjects. All of the programs evaluated in Phase II are covering the three key competencies for future logistics leaders.

V. Discussion

Current Requirements and Recommendations

The research highlighted that all of the schools are teaching the majority of the competencies. The programs with MBAs provide a wide and strong foundation in business of supply chain management/logistics courses. The two competencies that AFIT seems to be missing are Globalization and Finance/Cost Control. However, this is a consistent trend among all non-MBA programs used in this research. Also, the AFIT economics course is non-existent in the non-MBA programs and was not a competency identified during our research. As such, the authors would recommend deleting this course.

Globalization is discussed during courses at AFIT, however there isn't a stand alone course that melds the various academic subjects into one course that discuss their interaction on the firm within the global market. Globalization is a subject that entails a multitude of subjects (logistics, finance, international law, taxes, labor issues). It is acknowledged that AFIT does have an International Logistics course; however it wasn't offered during the 2005-2006 academic year. We suggest an International Logistics course be taught as a core course with AFIT's Logistics Management program. We would suggest looking at Michigan State's Course on Global Logistics (MSC 881). It looks at the "requirements for global operations and strategy development and the similarities and differences of international and domestic operations" (Michigan State, 2006). Or another option is Arizona State's Advanced Logistics (SCM 591c). The course "emphasizes contemporary issues faced by organizations as they compete in global markets. It aims to acquaint students with analytical tools necessary to make sound management decisions, and to provide students with an understanding of the growing complexity encountered in supply chains. Concepts covered include CPFR [Collaborative Planning, Forecasting and

Replenishment], global supply chains, outsourcing, new logistics technologies such as RFID, and supply chain planning” (ASU, 2006). Finance/Cost Control is the most neglected area of the AFIT Logistics Management program. Although Activity Based Costing is taught, there is a void of basic finance principles. The authors would suggest teaching a Finance/Cost Control Course and including Activity Based Costing as one part of this course. As a refresher, this subject area includes areas including being familiar with financial reports, statements, financial planning, cost control, cost analysis, and basic cost accounting. A plan of attack that could be used is to combine two of Ohio State’s courses Financial Accounting & Reporting (MBA 800) and Financial Management I (MBA 810). MBA 800 teaches “the mechanics of income statement, balance sheet, and fund flows; accounting policy choices; financial statement analysis using fund flows; ratios, quality of earnings, sustainable growth rates, and inflation adjustments” (Ohio State University, 2006). MBA 810 teaches the “development of an understanding of financial terminology, instruments, and foundations for analyzing and dealing with the financial management problems of business enterprises” (Ohio State University, 2006). The class should cover both traditional civilian financial principles and integrate Air Force finance and budget system requirements.

AFIT does include the future requirements identified, however it is recommended that AFIT look towards implementing a more inter-disciplinary and inter-industry approach when determining the overall program goals and individual course design. The inter-disciplinary approach could include bringing in subject matter experts to discuss current and emerging trends within the courses. Also, courses taught should stress the synthesizing of information. This information should be from different academic disciplines and how they interact and integrate with one another. The courses should encourage critical thinking. Furthermore, an inter-

industry approach needs to be used to foster business concepts and how these concepts affect the firm. These two areas are widely mentioned throughout the literature review and were seen in the top supply chain/logistics graduate programs across the country. One suggestion would be to implement the Penn State MBA schedule. Penn State uses a 7-1-7 model. The 14 week term is split into two seven week sessions split by an intensive one week immersion on several of topics. AFIT's courses could be taken over a 10 week period with a one week immersion by extending in class time by 15 minutes per session. These one week immersions could include field trips to various civilian industries and to major military logistic centers. This idea would foster the inter-industry concept and when coupled with a more interdisciplinary approach would provide the student with a more rounded education. Also, this approach might provide for a more robust capstone project. The authors suggest a capstone project that would require students to look at a real world problem to solve. This might include doing a project on a company or an Air Force logistics dilemma. The courses taught and experiences shared throughout the project should provide the foundation for this capstone project to be both educational and relevant. This may be a deviation of AFIT's Thesis/Graduate Research Project (GRP) requirement; however it may produce a better educational experience and would fall in line with the current AFIT Commandant's vision of what a GRP should entail. Both the inter-industry and interdisciplinary approach would allow for an education with more depth and provide an impetus to see immediate and meaningful application of what was taught.

Future Requirements and Recommendations

This research found that Networking/Computing, Supply Chain Management, and Logistics Center Operation Skills were almost universally accepted key competencies for logistics leaders in the future. Dr. Bernard J. La Londe and Dr. James L. Ginter from The Ohio

State University have an ongoing annual survey, “The Ohio State University Survey Of Career Patterns In Logistics”, that target senior logistics/supply chain executives who are members of the Council of Logistics Management and found very similar results to this research (2004:2).

Networking/Computing: Authors like Dr. Matthew B. Myers, an Assistant Professor in the Department of Marketing, Logistics, and Transportation at the University of Tennessee use terms like “knowledge-based technical competence, cross-functional experience, and collaborative interpersonal skills”, but the skills behind the differing terminology are similar (2004:4). Networking and Computing includes the ability to use technological tools that enable multiple functions and levels to manipulate data in an effective and efficient manner throughout the supply chain. La Londe and others support our findings with the discovery that their respondents believed the factor that will “most influence the growth and development of the corporate logistics function during the next decade” is Technology, Information, Integration (2004:18). All of the academic institutions in this research provided some level of networking and computer curriculum. However, companies may require a more detailed course of study according to Dr. Walter Zinn, Director of the MBLE Program at the Fisher College of Business of The Ohio State University, who found that the "companies that we spoke with were looking for people with more technical skills than they get in the typical MBA program" (Trunick, 2005:1). We recommend AFIT increase their focus in this area to ensure their students are aware of the latest technologies being implemented by civilian and government organizations. This subject area is a good opportunity for inter-industry involvement.

Dr. La Londe and others substantiate our research by identifying Supply Chain Management as the top course of study that their respondents would enroll in if they returned to the academic arena (La Londe and others, 2004:17). Supply Chain Management is a critical

process for Air Force logistics now and especially in the future. AFIT currently teaches a course on Supply Chain Management. However, we recommend the program include interaction with civilian and military logistics leaders by hands-on analysis of current supply chains. The Dayton area provides multiple civilian and military opportunities for interaction outside the classroom.

Logistics Center Operations include inventory management, warehousing, transportation, materiel handling etc. that form the “core capability for logisticians” according to Chen and others (2004:5). Dr. La Londe and Dr. Ginter identified inventory strategy, a core discipline in this subset, as one of the most influential factors on logistics for the future (2004:18). The Dayton area provides an exceptional opportunity for students to see for themselves these disciplines in action. This is the perfect opportunity to implement the immersion program discussed earlier.

These competencies will continue to be required for all logistics leaders in the civilian sector and especially in the military because “without an adequate understanding of the entire logistics system, a military leader may lack the proper perspective or a common frame of understanding to effectively plan and employ combat forces and logistics support forces” (Anderson, 2002:10). Our leadership is aware of this need as demonstrated by Secretary of the Air Force James G. Roche who said, "we need well-educated, well-trained professionals to carry out our worldwide mission ...logistics does not exist in a vacuum. To truly support our forces we need to understand our battle strategy. We cannot afford to be blinded or stovepiped by a specialty function or a specific area" (U.S. Air Force Policy Letter Digest, 2004:1).

Conclusion

“As the most technologically superior and powerful Air Force in the world, we are all aware that we must maintain our intellectual superiority with lifelong education for all Airmen - officer and enlisted.”

... Michael W. Wynne, Secretary of the Air Force

Secretary Wynne's observation that we must "maintain our intellectual superiority" has never been more accurate than in today's logistics field. This research's purpose was to compare military and civilian sector academic programs to required competencies identified by logistics leaders and researchers. This was completed to provide insight into whether the Air Force Institute of Technology is delivering programs equivalent to the top-level civilian institution's logistics management programs. The authors realize that AFIT and the civilian institutions researched may have different forces that affect the academic programs. For example, AFIT students are military members that will return to the Air Force to perform their profession of logistics within the military environment instead of working for a profit organization. The military environment is uniquely different than the business environment. As such, AFIT is unique and will have to react not only to the shifts within the supply chain management/logistics arena but also shifts within the military at large and within military logistics.

The research showed that AFIT is covering most of the competencies identified as being required by the current and future logistics leader. AFIT must ensure it is an organization that is adaptable and is capable in providing a relevant educational experience. It should continually adapt the logistics management program to stay abreast of the constantly evolving profession of supply chain management/logistics. Furthermore, AFIT should ensure curricula and methodology utilized to educate logistic leaders stays in step with this continual evolution.

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Appendix A: Curriculum for AFIT's Masters of Science in Logistics Management

AFIT: Masters of Science in Logistics Management (Operational Logistics)

STAT 525 ²	Applied Statistics for Managers I
OPER 501	Quantitative Decision Making
ORSC 542 ²	Management and Behavior in Organizations
MATH 291 ¹	Business Calculus
STAT 535 ²	Applied Statistics for Managers II
LOGM 617	Transportation and Strategic Mobility
ECON 520 ²	Managerial Economics
LOGM 629	Consumable Inventory Management
CMGT 523	Contracting and Acquisition Management
LOGM 601	Research Methods
XXXX	Logistics Elective
LOGM 590	Computer Simulation for Managers
LOGM 620	Activity Based Management/Costing
LOGM 621	Air Transportation Management
LOGM 628	Reparable Inventory Management
LOGM 615	Logistics Information Systems
LOGM 619	Transportation Policy
XXXX	Elective
OPER 799	Thesis
LOGM 627	Supply Chain Management

¹ Non-degree course requirement, undergraduate credit only

² Degree requirement for non-business undergraduates

The degree requires 75 quarter hours to graduate. Electives are typically taken within the logistics department.

Appendix B: Curriculum for AFIT's Masters of Logistics Management (IDE)

AFIT: Masters of Logistics Management (IDE)

STAT 525	Applied Statistics for Managers I
OPER 501	Quantitative Decision Making
LOGM 615	Logistics Information Systems
LOGM 620	Activity Based Costing
STAT 535	Applied Statistics for Managers II
LOGM 601	Principles of Research Methods
ORSC 542	Organization and Management Theory
LOGM XXX	Logistics Elective (Logistics Strategy or Strategic POM)
LOGM 590	Computer Simulation for Managers
LOGM 570	Inventory Management
LOGM 617	Transportation and Strategic Mobility
ECON 520	Managerial Economics
LOGM XXX	Logistics Elective
OPER 791	Research Project for Operational Sciences
LOGM 627	Supply Chain Management

The degree requires 53 quarter hours to graduate. Electives are typically taken within the logistics department. From the course descriptions one can infer the program is heavy in quantitative courses.

Appendix C: Curriculum for MIT's Masters of Engineering in Logistics (MLOG)

Students take a core of 7 courses and need a total 90 MIT course units to graduate.

MIT Core Courses:

ESD.260J Logistics Systems - Introduction to demand forecasting and inventory theory and control with emphasis on supply chain management. Analysis of tradeoffs between transportation and inventory costs. Routing and scheduling with inventory considerations, distribution networks design and carrier networks design, optimization of carrier operations with emphasis on truck and rail networks. Integration of carrier and shipper perspectives in system models. Logistics system performance metrics and the impact of logistics activities on an enterprise's financial performance. (Prerequisite: permission of instructor)

ESD.261J Case Studies in Logistics and Supply Chain Management - A combination of lectures and cases covering the strategic, management, and operating issues in contemporary logistics and integrated supply chain management. Includes: logistics strategy; supply restructuring and change management; and distribution, customer service, and inventory policy. (Prerequisite: permission of instructor)

ESD.262 Supply Chain Context - Leadership and management are taught within the supply chain context. Industry speakers, workshops, and exercises are used to teach how supply chain professionals can better work within a team environment. Lean management skills are stressed. Course is taught jointly with the Zaragoza Logistics Center.

ESD.263 Thesis Seminar - The thesis process, technical writing, and presentation skills. This seminar will organize the students into groups working on parallel topics and make sure that each student's project is launched.

ESD.264 Database, Internet, & Systems Integration Technologies - Survey of information technology covering database modeling, design, and implementation with an emphasis on relational databases and SQL. Internet technologies: http, html, XML, SOAP, security. Brief introduction to components and middleware. Introduction to design and implementation of multi-tier architectures, benchmarks, and performance. Data networking protocols and technologies. Students complete project that covers requirements/design, data model, database implementation, web site, and system architecture.

ESD.272 Logistics Facilities & Operations - Exploration of the technological and managerial issues involved in the design and operation of distribution and logistics physical facilities and associated information technology in an enterprise wise supply chain. Includes day-long site visits to logistics operations in the local area, as well as day-long software tutorials on commercial-grade software packages used in the design of

logistics networks. The curriculum also includes lectures and case studies from faculty and professional logistics consultants focusing on the design and operation of efficient logistics facilities.

ESD.290 Special Topics in Supply Chain Management - Subject presents a range of advanced topics in integrated logistics and supply chain management. Conducted in a lecture-discussion format, with participation of corporate executives as guest lecturers. Students prepare industry assessment analyses and make formal classroom presentations. Specific topics alternate from year to year, but basic content includes procurement strategies and strategic sourcing, dynamic pricing and revenue management tactics, mitigation of supply chain risk through supply contracts, strategic outsourcing of supply chain functions and operations, management and operation of third party logistics providers, and management of supply chain security.

15.874 System Dynamics for Business Policy - Why do so many business strategies fail? Introduction to system dynamics modeling applied to corporate strategy. Uses a mixture of simulation models, role-playing games, and case studies to develop principles for successful management of complex strategies in a dynamic world. Case studies of successful strategy design using system dynamics. Considers strategic issues such as business cycles, market growth and stagnation, the diffusion of new technologies, the misuse of forecasts, and the rationality of managerial decision making.

Source for MIT MLOG Core: <http://web.mit.edu/mlog/program/reqcourses.html>

MIT Electives (Students take a minimum of 18 course units). Average student takes 30-50 elective course units.

ESD.201J Transportation Systems - Introduces transportation as a large-scale, integrated system that interacts directly with the social, political, and economic aspects of contemporary society. Fundamental elements and issues shaping passenger and freight transportation systems. Underlying principles governing transportation planning, investment, operations, and maintenance. System performance and level-of-service metrics and the determinants of transportation travel demand. Design of transportation services and facilities for various modes and intermodal operations. Half-term subject offered in first half of term.

ESD.204J Carrier Systems - Carrier systems involve the design, operation, and management of transportation networks, assets, personnel, freight, and passengers. A number of different carrier systems are contrasted while models and tools for analyzing, optimizing, planning, managing, and controlling these systems are presented. Half-term subject offered second half of term.

ESD.205 Transportation Flow Systems - Design, operation, and management of traffic flows over complex transportation networks. Covers two major topics: traffic flow modeling and traffic flow operations. Deterministic and probabilistic models, elements of

queueing theory, and traffic assignment. Concepts are illustrated through various applications and case studies. Half-term subject offered second half of term.

ESD.269J Advanced Logistics and Supply Chain Strategies - A review of state-of-the-art planning models and practical tools for supply chain design, inventory and distribution management, and multi-plant coordination. Emphasis on the integration of supply chain components into a coordinated system to increase service level and reduce system-wide cost. Explores robust tools and off-the-shelf software packages that have proven effective in many industries; these include decision support systems, enterprise resource planning systems and e-commerce based strategies.

ESD.71 Engineering Systems Analysis for Design - Engineering systems design must have the flexibility to take advantage of new opportunities while avoiding disasters. Subject develops "real options" analysis to create design flexibility and measure its value so that it can be incorporated into system optimization. Subject builds on essential concepts of system models; mathematical optimization; decision and utility analysis. Special attention given to efficient analysis and practical applications.

1.224 Carrier Systems - Carrier systems involve the design, operation, and management of transportation networks, assets, personnel, freight, and passengers. A number of different carrier systems are contrasted while models and tools for analyzing, optimizing, planning, managing, and controlling these systems are presented. Half-term subject offered second half of term.

15.057 Systems Optimization - Application-oriented introduction to systems optimization focusing on understanding system tradeoffs. Introduces modeling methodology (linear, network, integer, nonlinear programming, and heuristics), modeling tools (sensitivity and postoptimality analysis), software, and applications in production planning and scheduling, inventory planning, supply network optimization, project scheduling, telecommunications, facility sizing and capacity expansion, product development, yield management, electronic trading, and finance.

15.062 Data Mining: Algorithms and Applications - Introduces students to a class of methods known as data mining that assists managers in recognizing patterns and making intelligent use of massive amounts of electronic data collected via the internet, e-commerce, electronic banking, point-of-sale devices, bar-code readers, and intelligent machines. Topics covered: subset selection in regression; collaborative filtering; tree-structured classification and regression; cluster analysis; and neural network methods. Examples of successful applications in areas such as credit ratings, fraud detection, database marketing, customer relationship management, and investments and logistics are covered. Hands-on experimentation with data-mining software is used.

15.067 Competitive Decision-Making and Negotiation - Introduction to mathematical modeling, optimization, and simulation, as applied to manufacturing. Specific methods include linear programming, network flow problems, integer and nonlinear programming,

discrete-event simulation, heuristics and computer applications for manufacturing processes and systems. Restricted to Leaders for Manufacturing students.

15.220 International Management - Focuses on the international dimensions of strategy and organization, and provides a framework for formulating strategies in an increasingly complex world economy, and for making those strategies work effectively. Topics include the globalization of industries, the continuing role of country factors in competition, organization of multinational enterprises, building global networks, and the changing managerial tasks under conditions of globalization. Half-term subject.

15.356 How to Develop "Breakthrough" Products and Services - Firms must develop major innovations to prosper but they don't know how. Recent research into the innovation process has made it possible to develop "breakthroughs" systematically. Subject presents several practical concept development methods, explains how and why each works, and the conditions under which each is effective. First-term half subject.

15.390 New Enterprises - Subject covers the process of identifying and quantifying market opportunities, then conceptualizing, planning, and starting a new, technology-based enterprise. Topics include: opportunity assessment; the value proposition; the entrepreneur; legal issues; entrepreneurial ethics; the business plan; the founding team; seeking customers and raising funds. Each student develops a detailed business plan for a startup. Subject intended for students who want to start their own business, further develop an existing business, be a member of a management team in a new enterprise, or better understand the entrepreneur and the entrepreneurial process.

15.665 Power and Negotiation - Provides understanding of the theory and processes of negotiation as practiced in a variety of settings. Designed for relevance to the broad spectrum of bargaining problems faced by the manager and professional. Allows students an opportunity to develop negotiation skills experientially and to understand negotiation in useful analytical frameworks. Emphasizes simulations, exercises, role playing, and cases.

15.760 Introduction to Operations Management - Introduces students to problems and analysis related to the design, planning, control, and improvement of manufacturing and service operations. Includes process analysis, project analysis, materials management, production planning and scheduling, quality management, supply chain management, reengineering, design for manufacturing, capacity and facilities planning, and operations strategy. 15.760 primarily for graduate students in Sloan School of Management. Course 15 undergraduates must have 6.041, 15.053, and 15.501 as prerequisites.

15.762 Operations Management Models and Applications - Builds upon concepts developed in 15.760 and 15.761. Focuses on models and techniques that operations managers use to diagnose and evaluate operational performance, and make short-term and long-term decisions. Introduces, through lectures, computer exercises, and case

discussions, various descriptive and decision-support models and methods for inventory management, production planning and scheduling, supply chain optimization, capacity planning, manufacturing systems design. Strongly recommended for Operations Management concentrators.

15.764 The Theory of Operations Management - Focus on theoretical work for studying operations planning and control problems. Topics vary from year to year, and include inventory theory, sequencing theory, aggregate production planning, production scheduling, multistage production/distribution systems, performance evaluation, and flexible manufacturing systems.

15.769 Manufacturing Policy - Provides unifying framework for analyzing strategic issues in manufacturing. Analyzes relationships between manufacturing managers and their suppliers, customers, competitors, senior management, and hourly workers. Also covers decisions in technology, facilities, global markets vertical integration and other strategic areas. Explores means of competition such as cost and quality, and innovativeness.

15.812 Marketing Management - Provides an overview of the major areas in marketing, including the assessment of consumer needs, market segmentation, targeting and positioning, product design and branding, pricing, advertising, forecasting demand, survey design, and consumer psychology. Coverage includes lectures, case studies, and class demonstrations. Not open to Sloan graduate students.

15.912 Technology Strategy - Outlines tools for formulating and evaluating technology strategy, including an introduction to the economics of technical change, models of technological evolution, and models of organizational dynamics and innovation. Topics covered include: making money from innovation; competition between technologies and the selection of standards; optimal licensing policies; joint ventures; organization of R&D; and theories of diffusion and adoption. Taught using a combination of readings and case studies.

Source of MIT MLOG electives: <http://web.mit.edu/mlog/program/electives.html>

Appendix D: Curriculum for Michigan State University – Master of Science in Logistics

Students are must earned a total of 36 credits to graduate.

MSC 870 Introduction to Logistics and Supply Chain Management - Integrated view of procurement, operations and logistics management. Management of the flow of products from raw material sourcing and acquisition through delivery to the final user.

MSC 871 Applied Data Analysis - Quantitative and statistical methods for decision making. Hypothesis testing, regression and correlation analysis, forecasting, linear programming, decision analysis and project management.

MSC 872 Distribution Fulfillment - Management of the firm's value creation process from product development through order receipt and delivery to consumer. Alternative approaches to developing customer value and the role of the demand and supply chain in providing it.

MSC 873 Procurement and Manufacturing Management - Strategic issues in procurement and supply management. Purchasing role in fulfilling the firm's operations and competitive strategies. Theory and practice for planning and controlling manufacturing operations.

MGT 875 Change Management - Role and process of organizational change management. Types of change, identifying need for change, and change management process.

COM 874 Communication in Logistics - Development of effective interpersonal communication skills. Oral communication in business settings. Use of appropriate technology for management presentations.

MSC 876 Logistics Operations Methods and Systems - Microanalysis of logistics and transportation services including customer service and order fulfillment, distribution operations, purchasing or operation of transportation services, third-party logistics providers and network design.

MSC 877 Logistics Information Technology - Role of information technology in logistics and supply chain management, planning and operations. Requirements, capabilities, and considerations for using information technology applications in logistics.

MSC 878 Logistics Systems Analysis - Process of solving logistics problems. Applications of analysis tools and techniques to identify benefits and costs of logistics change.

MSC 879 Supply Chain Logistics – Strategy and Applications - Analysis and solution of supply chain management cases and simulations. Teamwork, communication and job

skills. Situations involving purchasing, manufacturing, logistics and transportation as an integrated supply chain.

MSC 881 Global Logistics - Requirements for global operations and strategy development. Similarities and differences of international and domestic operations.

MSC 882 Logistics Field Study

Practical application of course material to a problem or situation in the student's organization.

Source for MSU: <http://www.bus.msu.edu/msc/logistics/courses.cfm>

Appendix E: Curriculum for University of Pennsylvania – MBA with Operations and Information Management Track (Closest thing to Supply Chain/Logistics researchers could identify).

UPenn Core Courses:

ACCT 620 Financial Accounting - The objective of this course is to familiarize the student with the basic concepts, standards and practices of financial accounting. The course is devoted to the basic financial statements, the analysis and recording of transactions, and the underlying concepts and procedures, with an eye toward the financial statement analysis.

ACCT 621 (.5 cu) Financial Accounting - The intended audience for this course is students with prior knowledge of financial accounting who understand: (1) the recording of economic transactions in the accounting records; (2) the basic financial statements that summarize a firm's economic transactions (the balance sheet, the income statement and the statement of cash flows) and (3) the fundamental concepts needed to prepare or understand published financial statements (e.g. use of accrual accounting). Exploiting prior knowledge, the course aims in six weeks to help students become effective users of financial statements.

ACCT 622 (.5 cu) Fundamentals of Managerial Accounting - This course emphasizes the use of accounting information for internal planning and control purposes. This orientation contrasts with financial accounting where the focus is on accounting disclosures for parties external to the firm. This course is intended as an introduction for individuals who will make business decisions and evaluate the performance of business units using data obtained from the accounting system. The course will cover the basic vocabulary and mechanics of cost accounting, basic issues involved in the design of a cost accounting system, and the role of management accounting in decisions concerning resource allocation and performance evaluation.

FNCE 601 Corporate Finance - This course serves as an introduction to business finance (corporate financial management and investments) for both non-majors and majors preparing for upper-level course work. The primary objective is to provide a framework, concepts, and tools for analyzing financial decisions based on fundamental principles of modern financial theory.

FNCE 602 Macroeconomics and the Global Economic Environment - This course is required of all students except those who, having prior training in macroeconomics, money and banking, and stabilization policy at an intermediate or advanced level, can obtain a waiver either by credentials or by passing an examination. The purpose of FNCE

602 is to train the student to think systematically about the current state of the economy and macroeconomic policy, and to be able to evaluate the economic environment within which business and financial decisions are made. The course emphasizes the use of economic theory to understand the workings of financial markets and the operation and impact of government policies.

LGST/BPUB 621 (.5 cu) The Governmental and Legal Environment of Business

This course provides students with a basic understanding of how the law and the political process affect business strategy and decision making. Topics include how market infrastructure (contracts, intellectual property, product liability law) affect business strategy, and how businesses deal with challenges involving government agencies or legislation. The course presents broadly applicable frameworks that will help students to manage and advise clients more effectively in a world heavily influenced by legal concerns and governmental forces.

LGST 652 (.25 cu) Ethics and Responsibility (cannot be waived) - LGST 652

considers the ethical responsibilities of managers and corporations. It is designed to raise difficult ethical conflicts and dilemmas, and to provide plausible frameworks for dealing with those conflicts. It is also designed to reveal common patterns of success and failure in managing ethics. A successful module engages students in a critical evaluation of managerial and corporate ethics, and encourages each student to develop a perspective about the role of ethics in business.

MGEC 621 (.5 cu) Managerial Economics - This course deals with applying microeconomic theory to the management of the firm in markets where the firm possesses market/monopoly power. The course will concentrate on the way that microeconomics may be utilized to enhance decision making within the manager's organization. The student will develop an understanding of the economic environment in which the firm operates and how to think strategically within it.

MGMT 621 (.5 cu) Management of People at Work - The material in this course develops some of the basic themes associated with managing people. In many cases, these themes make use of basic concepts that transcend the work place, such as the psychology of individual behavior or of work groups. The course concludes with a discussion of alternative models or systems of managing employees – for example, the dominant Japanese employment system as contrasted with traditional U.S. practices.

MGMT 652 (.5 cu) Foundations of Leadership and Teamwork - (cannot be waived)

This course focuses on individual leadership skills assessment and development, team building and performance, and team leadership. Key topic areas include self-awareness, working in teams, and leading others.

MGMT 654 (.5 cu) Competitive Strategy - This course focuses on the competitive strategy of the firm, examining issues central to its long- and short-term competitive position. Students are placed in the role of key decision makers and asked to address questions related to the creation or reinforcement of competitive advantage. The initial focus is on industry analysis and competitive advantage as it derives from the firm's position and strategic investments. We then focus on the development of firm-specific capabilities that contribute to competitive advantage. Finally, we address the logic of resource allocation in the diversified firm as it tries to enhance competitive advantage in different markets

MGMT 655 (.5 cu) Global Strategic Management - This course is an introductory course on the strategic management of multinational corporations (MNCs), focusing on the creation of competitive advantage in a global context.
individual projects (35% of grade).

MKTG 621 (.5 cu) Marketing Management: Program Design - This course addresses the management challenge of designing and implementing the best combination of marketing variables to carry out a firm's strategy in its target markets. Specifically, this course seeks to develop the student's skills in applying the analytic perspectives, decision tools, and concepts of marketing to such decisions as product offering (including the breadth of product line, features, quality level, and customer service), communications programs (with an emphasis on advertising, sales promotion, and the sales force), distribution channels (the role of distributors, retailers, and other intermediaries), and pricing to capture the value created for the customer.

MKTG 622 (.5 cu) Marketing Management: Strategy - In common with Marketing 621, the primary objective of this course is to introduce you to the concepts and theories underlying marketing decision making. Marketing 622 builds upon Marketing 621 with a stronger emphasis on the strategic considerations that drive and integrate the decisions made for each element of the marketing mix. Principal topics include resource allocation, market entry/exit decisions, and competitive analysis. In addition to a mix of cases and lectures, the course relies on a comprehensive computer simulation game that helps highlight these issues and provides the class with a rich set of realistic examples for discussion and analysis.

OPIM 621 (.5 cu) Decision Models and Uncertainty - This core course in management science has a twofold purpose. First, it seeks to introduce simple models and ideas that provide powerful (and oftentimes surprising) qualitative insights about a large spectrum of managerial problems. Its main topics include linear and integer programming, decision making under uncertainty, and simulation. Second, it aims to give a feeling for the kinds of problems that can be tackled quantitatively, the methods and software available for doing so and the difficulties involved in gathering the relevant data. The emphasis is on

models that are widely used in diverse industries and functional area, including finance, operations, accounting and marketing.

OPIM 631 (.5 cu) Operations Management: Quality and Productivity - This course emphasizes processes. A process is a set of interrelated work activities characterized by specific inputs and value-adding tasks that produce specific outputs.

OPIM 632 (.5 cu) Operations Management: Supply Chain Management - Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive. In this course we will learn (1) how to assess the appropriate level of supply flexibility for a given industry and (2) explore strategies for economically increasing a firm's supply flexibility. While tactical models and decisions are part of this course, the emphasis is on the qualitative insights needed by general managers or management consultants. We will demonstrate that companies can use (and have used) the principles from this course to significantly enhance their competitiveness.

STAT 621 (.5 cu) Statistical Analysis for Management - This course explores the use of the key statistical methodology known as regression analysis in solving business problems. Regression analysis permeates most of applied statistics. This course considers the application of regression in various contexts, such as the prediction of future sales and the response of the market to price changes. The use of regression diagnostics and various graphical displays supplement the basic numerical summaries and provides insight into the validity of the models

WHCP 653 (.25 cu) Management Communication (cannot be waived) - This course is required of all first year MBA students, and meets once a week for six weeks. WHCP 653 enables each student to improve his/her oral presentation skills, regardless of current skill level. Students may select from one of two course offerings: the basic communication course or a course designed specifically for non-native English speaking students.

Source: <http://www.wharton.upenn.edu/mbaresource/curriculum/core/index.cfm>

UPenn Electives:

Students are required to take 5 elective credits within the Operations and Information Management department. These credits are at the student's discretion. A sample of courses with the Operations Management track is:

OPIM 651 (.5 cu) Problem Solving, Design, and System Improvement - This course is intended to provide a methodology for tackling unstructured problems of all kinds and to provide specific knowledge about commonly encountered types of problems, such as selection problems, system improvement problems, planning problems, and design problems. The course will also develop a kit of commonly used problem solving tools such as multi-attribute decision analysis, root cause analysis, and design of experiments. Additional topics include methods for generating solution alternatives, visualization and presentation of data, and crisis management.

OPIM 654 Product Design and Development - The course provides the student with a number of tools and concepts necessary for creating and managing product development processes. The course consists of two interwoven parts. First, it presents the basic steps that are necessary for moving from a "cool idea" to a product sufficiently mature to launch an entrepreneurial start-up. This includes cases, lectures, and exercises on topics like identifying customer needs, developing a product concept as well as effective prototyping strategies. The capstone of this first part is a real project in which student teams conceptualize and develop a new product or service up to the completion of a fully functional prototype. Second, the course discusses a number of challenges related to product development as encountered by management consultants, and members of cross-functional development teams as well as general managers. We will analyze several cases related to, among others, resource allocation in R&D organizations, organizational forms of product development teams, as well as managing development projects across large geographic distances.

OPIM/ MKTG 655 (.5 cu) Integrating Marketing and Operations - This course covers topics that span marketing and operations management. Students will examine issues and decisions that require significant coordination between managers in marketing and operations. Topics include channel management, supply chain design, product variety management and service operations pricing and control.

OPIM 656 Operations Strategy and Process Management - This course examines how organizations can develop and leverage excellence in process management. The first module focuses on operations strategy. In these classes, we examine what constitutes an operations strategy and how organizations can create value by managing complexity, uncertainty, and product development. In the second half of the course, we discuss recent developments in both manufacturing and service industries. Specifically, we examine initiatives in quality, lean manufacturing and enterprise-wide planning systems.

OPIM 658 (.5 cu) Service Process Management - Elements common to most services make the management of their operations complex, however. In particular, services are intangible, not storable or transportable, and often highly variable. Frequently their delivery involves distributed operations with a significant amount of customer contact. All of these factors make service operations end up looking quite a bit different than manufacturing operations, and the task of achieving excellence in them requires specialized analysis frameworks and tools. This course covers a mix of qualitative and quantitative models that provide the necessary tools. The class will focus on simple models that should help you to better understand both the difficulty of managing and the underlying economics of the service operations being considered.

OPIM 697 (.5 cu) Retail Supply Chain Management - This course will examine how retailers understand their customers' preferences and respond with appropriate products through effective supply chain management. Supply chain management is vitally important for retailers and has been noted as the source of success for many retailers such as Wal-mart and Home Depot, and as an inhibitor of success for e-tailers as they struggle with delivery reliability.

Source UPenn Electives: <http://www.wharton.upenn.edu/mbaresource/curriculum/opim/>

Appendix F: Curriculum for The Ohio State University – MBA with Operations and Logistics Management Major

Students take a total of 98 quarter credit hours to earned OSU's MBA.

Core Courses:

MBA 800: Financial Accounting & Reporting - Mechanics of income statement, balance sheet, and fund flows; accounting policy choices; financial statement analysis using fund flows; ratios, quality of earnings, sustainable growth rates, and inflation adjustments.

MBA 812: Managerial Economics - This course approaches microeconomics from a managerial and organizational perspective. The objective is to develop a framework grounded in the fundamentals of economic theory that provides a powerful way of analyzing business problems and developing effective solutions.

MBA 825: Professional Development - The course focuses on using understandings and insights gleaned from observation, research, and reflection to communicate effectively in a variety of formats with diverse audiences. Speaking and writing in multiple contexts will be emphasized.

MBA 860: Organizational Behavior & Teamwork Skills - An overview of factors that influence individual work performance and techniques to improve it; analytical frameworks for determining effectiveness of given techniques in specific circumstances.

MBA 870: Data Analysis for Managers - Introduction to statistical inference and its use in decision making; major emphasis on achieving an application-oriented understanding of regression analysis.

MBA 801: Cost Accounting - Cost data for inventory valuation; cost data for decision making (pricing, product-mix, make or buy); cost data for performance evaluation and control.

MBA 810: Financial Management I - The development of an understanding of financial terminology, instruments, and foundations for analyzing and dealing with the financial management problems of business enterprises.

MBA 840: Marketing Management - Focuses on the interrelated elements of the marketing mix, its relationship with the other functional areas of management, and marketing responses to the external environment.

MBA 850: Operations Management - Introduction to basic operations principles; exploration of major operating problems; strategic and tactical decision making; emphasis on determination of policy for managing productive resources; role of operations manager.

MBA 871: Decisions & Decision Models - The use of quantitative techniques in practical decision-making situation; emphasis on concepts with relatively little mathematics utilized to describe the techniques.

MBA 820: Macroeconomics - Analysis of general economic conditions and their relation to decisions of the firm; methods for decision support and strategic planning.

MBA 880: Legal & Regulatory Environment - Topics include: Sources of law; court systems, litigation and alternatives to litigation; topics on the personal liability of managers such as equal employment practices, insider trading, price fixing; corporate social responsibility, social responsibility of managers.

MBA 980: Strategy Formulation & Implementation - Introduction to the nature of corporate strategy, development of a conceptual framework for understanding competition in industries, and the factors that shape competitive success or failure.

Source OSU Core MBA courses:

<http://fisher.osu.edu/Programs/Graduate/Courses/MBA/Full-Time-MBA/Core-Curriculum/Course-Descriptions/>

OSUs MBA with Operations and Logistics Management Major Electives:

Students will take M&L 880 and either MGT 835 or M&L 881.

M&L 880 - Logistics Management -Management of movement services and coordination of demand and supply patterns for optimization of physical systems in terms of cost and customer service.

MGT 835 - Operations Planning and Materials Management - The major responsibilities of materials managers, including aggregate planning and master scheduling, inventory management and scheduling.

M&L 881 - Analysis & Design of Logistics System - General logistics problems and solutions including: demand forecasting approaches and techniques; inventory control and deployment; facility location and network design; vehicle scheduling and dispatching algorithms. Emphasis on the correct selection and application of an appropriate technique to a specific problem. Prerequisite: M&L880.

Of the below selective courses students will take three of the five courses.

SELECTIVE COURSES:

MGT 830 - Service/Quality Management - Study of the tactical and strategic issues defining, measuring and managing product and service quality in service organizations. Topics include service process re-engineering, performance measurement, service/quality, standards and employee empowerment.

MGT 832 - Matching Supply with Demand - This course is unique in that it uses a novel and logical approach. The course covers a range of operations management topics that all impact managing supply, managing demand, or both. From the supply side we cover topics such as purchasing, outsourcing, capacity, and production. From the demand side we cover topics such as new product introduction, forecasting, and revenue management. We also cover supply chain coordination, which covers both supply and demand.

MGT 834 - Strategic Design of Operations/Logistics Systems - Managing systems of people and technology to create capabilities in operations. Emphasis on new approaches to managing operations and logistics that promise strategic advantage.

MGT 836 - Customer Driven Manufacturing in the Global Market - Development of effective linkages between the marketing and manufacturing functions in strategic planning for a business; application to case studies involving U.S. and overseas firms.

MGT 840 - Lean Enterprise Leadership II (Implementing and Managing Lean Processes) - Offered with the advice and support of Ford Motor Company's Lean Resource Center and its advisory board members, the goal of this course is to be an attractive, high-visibility course that provides students with academic content and practical skills on lean manufacturing and supply chain practices. Included in the course will be an introduction to lean processes, key methods such as JIT and visual controls, process simulation, process mapping tools, and a real-time critique and reflection of a manufacturing plant guided by an expert. Much of the course material will be presented by top consultants used by Ford. The classroom segment is a prerequisite for the internship, although it can be self-contained. High quality summer internships at Ford or its key suppliers will be facilitated by Ford.

M&L 884 - Field Problems in Logistics - This course provides students with a supervised opportunity to test their problem-solving skills on an actual business problem through developing, executing and evaluating a research design.

M&L 885 - Supply Chain Management - Analysis and evaluation of emerging patterns of industry behavior illustrative of supply chain management; strategic foundations that support supply chain strategy and operational skills required.

MGT 894.01 – Six Sigma Principles (no course description listed)

Source OSU Operations and Logistics MBA Major:

<http://fisher.osu.edu/Programs/Graduate/Courses/MBA/Full-Time-MBA/Specializations/Majors/Operations-&-Logistics/>

Appendix G: Curriculum for Purdue University – MBA with Global Supply Chain Management Option

Students seeking an MBA at Purdue must successfully complete 60 credits.

Core Courses:

ECON 514 Microeconomics - An introduction to microeconomic theory. Analysis of consumer demand, output and input decisions of firms, price determination, economic efficiency, market structures, and market failure.

MGMT 600 Financial Accounting - The two-course accounting sequence employs a user's perspective on the firm's database. First, the standard accounting model is developed into a working tool, as no prior study of accounting is assumed. Then illustrative business cases are discussed to show how external reports conform to financial contracts and public regulation. Public reports primarily directed to investors and creditors are analyzed to reconstruct the economic events and managerial decisions underlying generally accepted accounting standards.

MGMT 670 Quantitative Methods I - Introduction to quantitative decision procedures under uncertainty. Applications of descriptive statistics, probability models, simulation models, interval estimates, and hypothesis testing to management problems. Managerial-oriented cases are used in instruction.

MGMT 692 Managerial Communication Skills - The general objective of the MCS oral module is to enhance your professionalism in managerial contexts by improving your oral communications skills. In addition, upon completing the oral component, you should be able to: 1) Develop a good presentation in terms of format, content and organization; 2) Adapt your presentation to varying audience needs and levels; 3) Use visuals effectively and persuasively; 4) Deliver a business presentation with improved confidence and style; 5) Competently evaluate the strengths and weaknesses of other presenters.

OBHR 681 Behavior in Organizations - Individual and group behavior are the central components of the study of behavior in organizations. Focus is on the managerial application of knowledge to issues such as motivation, group processes, leadership, organizational design structure, and others. The course employs cases, exercises, discussions, and lectures.

MGMT 390F Leadership and Ethics - Leadership and Ethics is a program of educational events designed to help first-year students in the master's programs master skills and concepts that will enhance their management education. They are an integral part of the professional master's program at Krannert. Every Leadership and Ethics program is explicitly lined to the intellectual and professional development goals of the program. Leadership and Ethics is used to integrate topics covered in multiple core courses, enable hands-on experimentation, role playing or other exercises and simulations, or preview and use new management technology. Leadership and Ethics also introduces new topics or examines current issues that are not covered in core or elective courses, such as ethics, international management, diversity training, or entrepreneurship.

MGMT 601 Managerial Accounting - Oriented to managers, the second course of the accounting core examines the firm's internal systems of costing products or services and their interpretation. A variety of manufacturing and service industries are studied to demonstrate design of flexible cost systems to match the firm's technological, competitive and/or multinational environments. Applications to budgeting, variance analysis, pricing models, performance evaluation and incentives are demonstrated. Design and use of accounting data are linked to other subjects in the program core and to ethical aspects of accounting policy issues.

MGMT 610 Financial Management I - Analysis of short-term working capital needs. Cash budgeting procedures, pro forma statements, major types of short-term loan arrangements, and short-term asset management.

MGMT 620 Marketing Management I - An integrated analysis of major marketing decisions, including product pricing, advertising, distribution, and sales force policies.

MGMT 671 Quantitative Methods II - A continuation of Quantitative Methods I. Applications of regression procedure, forecasting technique, and statistical design of experiment method to management problems. Managerial-oriented cases are used throughout the course.

MGMT 692 Managerial Communication Skills - The general objective of the MCS oral module is to enhance your professionalism in managerial contexts by improving your oral communications skills. In addition, upon completing the oral component, you should be able to: 1) Develop a good presentation in terms of format, content and organization; 2) Adapt your presentation to varying audience needs and levels; 3) Use visuals effectively and persuasively; 4) Deliver a business presentation with improved

confidence and style; 5) Competently evaluate the strengths and weaknesses of other presenters.

MGMT 390F Leadership and Ethics - Leadership and Ethics is a program of educational events designed to help first-year students in the master's programs master skills and concepts that will enhance their management education. They are an integral part of the professional master's program at Krannert. Every Leadership and Ethics program is explicitly lined to the intellectual and professional development goals of the program. Leadership and Ethics is used to integrate topics covered in multiple core courses, enable hands-on experimentation, role playing or other exercises and simulations, or preview and use new management technology. Leadership and Ethics also introduces new topics or examines current issues that are not covered in core or elective courses, such as ethics, international management, diversity training, or entrepreneurship.

MGMT 611 Financial Management II - This course is a continuation of your introduction to financial management. The objective of the two courses is to provide you with the conceptual framework necessary to appreciate and understand the problems facing a financial manager.

MGMT 621 Marketing Management II - Introduces students to the analytical, strategic, and tactical aspects of marketing management. Exposes students to the issues and challenges in the management of the marketing mix, including product policy, pricing, marketing communications, and distribution policy.

MGMT 650 Strategic Management I - Concepts and methods that integrate previous training in functional areas of management. The perspective is that of the general manager charged with directing the total enterprise. Emphasis is given to formulation and implementation of strategy.

MGMT 660 Operations Management I - The goals of this course are: First, to help students gain an exposure to the spectrum of operations-management activities and to the types of decisions that operations managers are involved in. Second, to help students to get insights into the basic trade-offs associated with operations-management decisions. Third, to introduce a variety of tools and techniques for helping operations managers reach and implement their decisions. Fourth, to expose students to recent developments in world-class operations. A mixture of plant tours, case analyses, and operations-research techniques will be used, as appropriate. An assortment of micro-computer exercises and/or tools will also be employed.

MGMT 390S Leadership and Ethics - Leadership and Ethics is a program of educational events designed to help first-year students in the master's programs master skills and concepts that will enhance their management education. They are an integral part of the professional master's program at Krannert.

MGMT 659 Strategic Management II - This is the second part of the Strategic Management core course. Designed to provide an appreciation for the total firm perspective and the means by which top managers create and sustain competitive advantage in today's challenging and complex business environment. Focuses on ways in which organizational structure and administrative systems affect top managers' strategic choices.

MGMT 664 Operations Management II - The basic goals of this course are: First, to help students gain an exposure to the spectrum of operations management activities and to the types of decisions that operations managers are involved in. Second, to help students to get insights into the basic trade-offs associated with operations-management decisions. Third, to introduce a variety of tools and techniques for helping operations managers implement their decisions. Fourth, to expose students to recent developments in world-class operations.

MGMT 683 Management of Information Systems - The objective of this course is to train students to identify and resolve managerial issues regarding the use of information technology in organizations. The focus is on building intuition about core concepts and developing frameworks and ways of thinking about technology. Accordingly, the emphasis of this course is to develop insights into what, when and how information technology can be used within and among organizations to improve efficiency, differentiate markets and services, enhance performance in existing markets, and create entirely new markets by changing the rules of competition.

MGMT 630 Legal & Social Foundations of Mgmt. I - The basic purpose of this course is to give future professional managers an insight into the structure and operation of the judicial process as it affects managerial decision making. While the course does not purport to give the student specific legal skills to solve legal problems, it does sensitize the student as to the current legal problems and pitfalls which he/she will face in the day to day management of business. It also stresses the need for managers to seek legal input during the decision making process rather than seeking a defense, after an offense has been committed and litigation commenced.

ECON 515 Macroeconomics - Investigation of the causes of macroeconomic fluctuations in the economy. Looks at changes in inflation, unemployment, real output, interest rates, and exchange rates, and explores why they occur, what their effects are, and what, if any, role government should play in dealing with these problems. A mixture of theory and case studies with reference to historical case studies. Current macroeconomic problems will be discussed with a focus on the international aspects of macroeconomic problems.

Source for Purdue's MBA Core Courses:

http://www.krannert.purdue.edu/programs/masters/degree_programs/MBA2007.asp

Purdue uses an interdisciplinary approach with its electives and students take five elective courses for the Global Supply Chain Management Option. They must take a minimum of two from group one and two from group two.

Group 1: Operations, Marketing, Quant Methods and MIS

MGMT 561 Logistics - Logistics deals with the integration of information and material flows to delivery efficiencies to the firm. In short, we will discuss all aspects of managing the flow of material in the firm except the details within the plant. In many logistics situations at least two independent decision makers are involved, hence the need for contracts to coordinate the system. We will first discuss concepts such as total logistics costs, managing transportation and inventory, cross docking, take or pay contracts, JIT distribution etc. We will then focus on two industries * the apparel industry and the grocery industry. These industries provide a context for understanding the role of reactive capacity as well as the link between pricing and the logistics system. The course provides an overview of concepts, provides specific tools that can be used to make decisions and discusses cases that illustrate the link between logistics decisions and the other functional areas of the firm

MGMT 564 Mgmt Of Service Operations - In this course, the differences and similarities between service and manufacturing organizations will be analyzed. Specifically, the course examines how to identify hallmarks of superior service; manage capacity and demand for services, and improve service operations. The special characteristics of services require an interdisciplinary approach to analyzing operations. We draw on concepts from strategic management, management science and marketing to get insight into service characteristics. Recent offerings have include: Case Studies and Readings that Illustrate How to Manage Operations in Restaurants, Airlines and Hospitals Student Projects that Require a Service Audit of an Organization Computer Exercises on Queue Management

MGMT 590D Sourcing & Procurement Mgmt - This course examines the roles of strategic sourcing and purchasing management in managing a company's value chain. Topics include strategic sourcing, outsourcing/off-shoring, e-procurement, procurement integration, and supplier management (e.g., capability development, cost management, quality management).

MGMT 590Y E-Commerce & Supply Chain Mgmt - This course focuses on the logistics aspects of e-commerce. Most goods bought on the internet are not available immediately to the customer to use and experience. Thus, logistics plays a significant role in the value proposition of an e-commerce company. Delivery of the product to the customer at or before the promised date, high fill rate for a large selection of products, and the agility to respond to changing product offerings all provide significant challenges to the logistics function of an e-commerce company. The course focuses on the tasks faced by a Chief Logistics Officer (CLO) in an e-commerce company and discusses

strategic issues, tactical choices, and operational details. Speakers from the logistics segment of the e-commerce industry will discuss current issues and lead student discussions.

MGMT 623 Marketing Of Industrial And Tech Products (BUSINESS MARKETING) - Business marketing involves the marketing of goods and services to business organizations (including retailers and distributors), government and institutions. This course focuses on special problems arising in business marketing situations. The primary objectives of the course are to: (i) Develop critical analysis and problem-solving skills with respect to industrial marketing problems; (ii) Gain an understanding of manufacturer-supplier and manufacturer-distributor (or retailer) relationships; (iii) Examine issues related to coordination across functions (marketing, manufacturing, engineering, etc.)

MGMT 649 Global Economy - The course aims to develop skills in designing and implementing global marketing strategies and programs in diverse contexts. The course materials cover both large and small firms, marketing a broad range of consumer and industrial products and services, and operating in developing and developed country-markets in all geographic regions.

MGMT 667 International Ops Mgmt - In this course, we will examine the role played by the operations function in making the strategic decision of where to locate facilities and explore how to coordinate worldwide operations to enhance performance. The impact of trade regulation and foreign exchange risk will also be considered. The course includes modules on 1) Variations in Managing Operations, 2) Rationalizing Local Operations, 3) Managing Change and 4) Operations in Emerging Markets. Case Analysis of Various Global Industries Computer-Based Exercises In-depth Lectures on Specific Markets Student Projects that Examine Firm-Specific Manufacturing Operations

MGMT 690D Info Security For Managers - This course will explore the various issues pertinent to maintaining acceptable levels of Information Security within organizations. Topics include risk analysis, resource identification, a basic introduction to information security architecture and infrastructure, policy development and deployment, and legal and regulatory issues, including those pertaining to privacy. The course is intended to raise awareness of information security issues across organizations and will be targeted towards managers in all areas, not just information systems.

MGMT 690N Data Mining - Data mining is the non trivial extraction of implicit, previously unknown, and potentially useful information from data William J. Frawley, Gregory Piatetsky-Shapiro and Christopher J. Matheus. Variety of techniques to identify nuggets of information or decision-making knowledge in bodies of data, and extracting these in such a way that they can be put to use in the area such as decision support, prediction, forecasting and estimation. The data is often voluminous, but as it stands of low value as no direct use can be made of it; it is the hidden information in the data that is useful.

Group II: Finance, Accounting, Strategy and OBHR

MGMT 509 International Accounting - The perspective of decision-making, managerial control as well as reporting risk and return for international business remain primary objectives in reporting. The course aims to provide 'hands on' computer competence and comfort in the first module on foreign currency translation, for which spreadsheets are ideal. The accounting and finance of risk management is developed within the context of spreadsheet algebra and the computer is employed for modeling and what if variations. The course provides experience with accounting for derivatives.

MGMT 643 Financial Risk Management - This course has two objectives. The first is to consider whether and how risk management can increase a firm's value. The second is to understand risk management products and how to use them to build customized risk management programs to achieve organization-specific objectives.

MGMT 645 Mergers, Acquisitions & Corp Control - This course explores mergers, acquisitions, and other corporate control transactions using readings, case study analysis, and project work. The focus is on the mechanics of the transactions themselves, the valuation of the firms involved, the role of the various parties involved, and the causes and consequences of these activities. Because mergers and acquisitions represent significant changes that involve the entire enterprise the course pulls together material covered in previous finance courses and links financial decisions with the overall strategy of the firm.

MGMT 689 Strategy Implementation In Multinational Corp - This course focuses on the challenges faced by managers as they implement competitive strategies across different countries and regions and will be particularly useful for students interested in international work. Major topics and frameworks include strategic alliances and networks, international acquisitions and diversification, global competitive dynamics, regional issues, as well as the impact of trends in these areas. These topics will help us address challenges such as collaboration across boundaries, role of country subsidiaries and country managers in global organizations, and cross-border coordination of capabilities and operations.

MGMT 691V Strategic Management III - This course focuses on key issues in formulating and implementing strategies to create and maintain a sustainable competitive advantage. By focusing on a firm's strengths and weaknesses, we analyze the impact of change and other important environmental forces on the unfolding opportunities for establishing and sustaining competitive advantage. The emphasis of this course is on pragmatic and action-oriented general management skills. However, a considerable body of theory has evolved within the disciplines of strategy, economics, finance, marketing, organization theory, and international business that have salient implications for general management.

MGMT 690Z Strategic Cost Mgmt - The objective of this course is to provide a general perspective on these topics and, where possible, to establish and explore how they are connected. Applying these tools should lead to the continuous reduction of resources used while simultaneously holding or even increasing value.

OBHR 650 International HR Management - OBHR 650 is concerned with the problems of managing human resources, mainly from the perspective of the multinational firm. It includes consideration of principles and practices relating to the management of expatriate employees, foreign employees and third country nationals in a wide range of national cultures and institutional settings. Class meetings will focus on recruitment and selection of a global work force, performance management, reward systems, management development, and employee relations for companies in industrialized and newly industrializing nations.

OBHR 669 Negotiations In Organization - Decision making examines organizational context, stages, creativity, biases, and group processes. Negotiations examine strategies for preparing and conducting negotiations. The principal focus is on individual and interpersonal aspects of each.

Source Purdue MBA Global Chain Management Option courses:

http://www.krannert.purdue.edu/programs/masters/degree_programs/options/gscm.asp

Appendix H: Curriculum for Arizona State University – MBA with Supply Chain Management Specialization

Students seeking an MBA at ASU must successfully complete 58 credits (30 core credit hours, 14 SCM credit hours, and 14 additional electives).

Core Courses:

LES 579 Legal, Political, & Ethical Issues - Study of legal, ethical, and political components of business decisions; self-regulation and social responsibility as regulatory and political strategies.

MGT 502 Organization Theory & Behavior - Concepts and applications of management including motivation, leadership, group dynamics, organization design, decision-making, communication, and organization change.

MGT 588 Introduction to Strategic Management - An overview of strategy and policy in the organization, emphasizing the integration of decisions in functional areas.

QBA 502 Managerial Decision Analysis - Fundamentals of quantitative analysis to aid managerial decision making under uncertainty.

BUS 594 Career Leadership - Key skills necessary to identifying a career path, exploring career opportunities and self marketing. Formulation of a career action plan including resumes, cover letters and interview preparation.

ACC 502 Financial Accounting - Financial accounting concepts and procedures for external reporting.

ECN 502 Managerial Economics - Application of microeconomic analysis to managerial decision-making at the firm-level in areas of supply and demand, production, cost, and pricing. Evaluation of competitive strategies.

FIN 502 Managerial Finance - Theory and practice of financial decision making, including risk analysis, valuation, capital budgeting, cost of capital, and working capital management.

SCM 502 Operations & Supply Management - Conceptual foundations for operational and logistic functions for all types of organizations. Application of analytical methods to production problems. Emphasis on quality systems and process control.

ACC 503 Managerial Accounting - Managerial accounting concepts and procedures for internal reporting.

CIS 502 Information Management – No Course Description Given

MKT 502 Marketing Management - Managing the marketing function; market and environmental analysis; marketing planning, strategy, and control concepts. Development and management of marketing programs.

ECN 503 Global Economics for Managers - Application of macroeconomic analysis to managerial decision making in areas of demand, production, cost, and pricing. Evaluation of competitive strategies with a global perspective.

MGT 589 Strategic Management - Formulation of strategy and policy in the organization, emphasizing the integration of decisions in functional areas.

Supply Chain Management Specialization Courses:

SCM 502 Operations and Supply Management (required specialization course) - Conceptual foundations for operational and logistic functions for all types of organizations. Application of analytical methods to solve production problems. Emphasis is on quality systems and process control

SCM 511 Integrated Supply Chain Management - The topic of this course is managing the supply chain that plans, sources, makes and delivers an organization's goods and/or services – from suppliers of raw materials through to the final customer (and sometimes the reverse!). This course will help you to 1) develop and manage efficient and effective supply chains, 2) understand the roles of the various functions (purchasing, operations/manufacturing, transportation/logistics, etc.) in managing resources for competitive advantage, 3) develop the importance of the sourcing, manufacturing/operations, and distribution functions to the formulation of business and corporate strategy 4) further develop your team, leadership and presentation skills. In-class discussions, cases, and question-and-answer play an essential part of your learning experience in this course.

SCM 532 Strategic Cost and Value Management - This course provides an overview of strategic cost and value management in the supply chain, and introduces students to many of the tactical tools required to understand and manage internal and external supply chain costs. Topics and tools that will be introduced and used include total cost of ownership, target costing from buyer and supplier viewpoints, supplier cost analysis, supplier price analysis, supplier “should cost” analysis, cost sharing issues, and cost implications of outsourcing.

SCM 551 Operations Planning and Execution - Companies that achieve operational excellence create products and services with the highest quality, lowest cost, and best timeliness of delivery. This course teaches students how to design new operations, and

assess and change existing ones, including quality, work flow and inventory management, and new product development. Particular emphasis is placed on modern approaches such as lean manufacturing, just-in-time inventory control systems, and concurrent engineering. Instruction methods include in-class exercises and simulations, computer-based assignments, and group analysis of case studies. On completion, the student will be able to perform process mapping and analysis, and design and implement performance measurement systems and associated quality, work flow, and inventory control systems.

SCM 541 Logistics in the Supply Chain - This course provides an overview of logistics topics in supply chain management with an emphasis on logistics as a key enabler of customer satisfaction and cost minimization. In particular, students are introduced to modern tools for network design, inventory planning, and the selection of appropriate third party logistics service suppliers. It emphasizes practical applications with the method of instruction combining lectures, guest speakers and discussions of current events in the logistics environment. Students are expected to complete a network design, a case study in outsourcing, and an inventory management simulation.

SCM 587 Project Management - The W.P. Carey Supply Chain Management program recognizes it is essential to develop sophisticated project management skills for multi-functional team environments. This course addresses the unique challenges of supply chain management projects in all sizes in all types of business environments by extending traditional project management concepts into the supply chain arena

SCM 593 Corporate Projects - This is the capstone course that spans from January-May in the second year. Students work in assigned student teams with a corporation to thoroughly analyze a business problem or opportunity, provide recommended alternatives, and create an implementation plan for the selected alternative. Student performance includes written and oral presentation to business sponsors and the use of spreadsheet and project planning software

SCM 515 Decision Models for Supply Chain Management - This course helps students develop practical analytical and spreadsheet skills while introducing quantitative modeling tools that are widely used to aid management decision making. The course focuses on structuring complex business decision problems to make them tractable by systematically identifying alternatives, objectives, constraints, and uncertainties, and quantifying the relationships among them. The emphasis is on formulating models in a spreadsheet (Microsoft Excel) environment and on applying readily available spreadsheet tools to solve these models and gain insights into the business problems. The course is taught largely through the use of examples. These examples come from a wide variety of areas such as logistics, procurement, workforce scheduling, capital budgeting, production and inventory planning, project evaluation/selection, resource allocation, facilities location and expansion, new product introduction, portfolio optimization, and bidding. Featured modeling approaches include optimization, Monte Carlo (risk analysis)

simulation, and decision analysis. Practical methods for obtaining probability data in conjunction with risk and decision analysis models are also presented.

SCM 521 Supply Management and Negotiation - Selecting, developing, and executing appropriate sourcing strategies and processes. The course educates students on the best practices to identify and segment suppliers, evaluate supplier markets and financial conditions, and lay the groundwork for fact-based negotiations. Both case studies and simulations are used as well as projects involving the formulation of strategies for actual commodities.

SCM 591a Supply Chain and Service Management in Internet-Retail Channels - In this course, students will learn to strategically design and develop integrated supply chain and service management strategies for organizations that rely, at least partially, on Internet technology to transact with end consumers. To accomplish this objective, fundamentals from three business areas—supply chain management, marketing, and information management—will serve to establish the course’s theoretical underpinnings. Along with this foundation, applied concepts, analytical tools, and practical insights will develop the knowledge necessary to plan, organize, operate, and control a variety of processes, resources, and relationships in supply chains striving to meet profitably consumers’ demand via the Internet.

SCM 591bE-SCM - This course covers electronic commerce tools and applications for supply chain management. The course focuses on B2B electronic commerce and only incidentally covers B2C or C2C. The course examines how internet based technology can be used to increase the efficiency and effectiveness of SCM business processes. The course takes a management perspective and always asks the question, “What is the ROI from the use of any internet based software application in SCM?” The course helps prepare students to evaluate, implement, and manage e-tools and applications for SCM. The course covers internet technology but does not require writing or running software programs. Specific topics include: electronic marketplaces, industry sponsored marketplaces, company portals, spend analysis, supplier finding and evaluation, constructing and analyzing RFxs, reverse auctions, purchasing automation, electronic catalogs, logistics automation, and collaborative systems

SCM 591c Advanced Logistics - This course is an extension of the material covered in SCM 541 during term 5. The course emphasizes contemporary issues faced by organizations as they compete in global markets. It aims to acquaint students with analytical tools necessary to make sound management decisions, and to provide students with an understanding of the growing complexity encountered in supply chains. The course emphasizes practical applications by combining instructor lectures with multiple guest lectures from companies implementing substantial change in their particular logistical activities. Concepts covered include CPFR, global supply chains, outsourcing, new logistics technologies such as RFID, and supply chain planning.

SCM 591d Global Supply Chain Design - This course will take students through issues of supply chain design from both quantitative and qualitative perspectives. The importance of supply chain design is reinforced by covering key concepts in the book *Clockspeed*, including both product and supply chain design. Students complete a country study and to characterize the leading supply chain practices for an industry of their choice, thus integrating previous learning in sourcing, operations, and logistics.

Source: All ASU courses taken from ASU Curriculum Document (McCulloch, 2006)

Appendix I: Curriculum for Pennsylvania State University – MBA with Supply Chain Management Portfolio

Students in PSU's MBA program participate in a unique 7-1-7 format. They take a set of courses for 7 weeks, then participate in a 1 week immersion course, and finally end the term with finishing the original courses started in the first 7 weeks.

Core Courses:

500 Marketing - Development of a marketing management focus, including market analysis, competition analysis, and decisions in pricing, products, promotion, and distribution channels.

501 Management - Examination and application of concepts of human behavior and organization to managing people in work organizations.

502 Team Processes And Performance - Development of managerial skills and techniques for diagnosing, intervening and leading effective teams.

504 Ethical Leadership - Introduces students to their ethical responsibilities as business leaders.

505 Negotiation Theory And Skills - Development of managerial skills for distributive and integrative negotiations at the two-party and team levels.

510 Supply Chain And Operations Management - Introduction to the organizational processes and methods used to create and deliver goods and services.

511 Financial Accounting - Basic concepts and principles (i.e., the jargon) underlying financial accounting practices.

512 Risk & Decision - Construction and use of quantitative methods in business decision-making.

517 Communication Skills For Management - Development of communication skills required for management; audience awareness, style, individual and group presentations.

521 Introduction To Managerial Accounting - Cost accounting and the design of management accounting systems for planning and controlling operations, and for motivating personnel.

523 Information Technology - An introduction to information technologies critical to business organizations.

531 Introduction To Finance - An intensive examination of techniques available to aid the financial manager in decision.

533 Economics For Managers - An introduction to the tools of economic decision making and a consideration of firm, industry, and global economic influences on economic decision making.

535 Global Perspectives - An overview of the global business environment.

571 Strategies For Converging Economies - Analysis and application of market and non-market concepts and techniques in business.

BA 597B Advanced Communications Special Topics in Corporate Communication: Interpersonal Communication in the Work Place - This course examines the principles and practices that explain, predict, and control how interpersonal communication works effectively or ineffectively in the workplace. As BA 517 examines the qualities of effective oral, written, and graphic communication; BA 597B examines the qualities of effective interpersonal communication. Elective SCM

EBIZ/MKTG 543 e-Marketing - Offers students the concepts and tools to design and deploy marketing strategies to help their organizations develop enduring relationships with their customers in a global, networked, and digital economy. Covers such topics as emerging market mechanisms (online shopping; B2B exchanges), enhancing relationships with various downstream stakeholders (online information links with distributors), and new marketing tools and techniques (e-mail and banner advertising; Customer Relationship Management). Elective SCM

MGMT 520 Team Facilitation Provides students with an in-depth understanding of team dynamics and the opportunity to develop skills for facilitating teams to achieve effective performance through the facilitation of one or more first-year MBA teams. Specific course topics include models of group development, diagnosing team problems, selecting effective intervention strategies, skills in giving and receiving feedback, conflict management, and working constructively with gender, race, and cultural differences within teams. Elective for SCM.

MGMT 521 Complex Negotiations - Complex Negotiations is an elective course that is designed to help students develop understanding and competencies necessary for conducting complex multi-party negotiations. Topics include: framing of negotiations, dealing with internal and external negotiations simultaneously, dealing with social dilemmas, mediation, negotiating across power differences, multiparty negotiations, and international business negotiations. Elective for SCM.

MGMT 531 Strategy Implementation & Org. Change - Provides students with key analytic ability to assess the gap between the current status of the organization and the

need to implement a new strategy or execute change, and then identify a strategy for closing the gap. Students will develop facility with two essential frameworks: a model of organizational alignment and a model for managing the change process. The topics covered include alignment of organizational structure, information and decision processes, rewards, people, and symbols; persuasion, resource, time and pacing, and leadership by the top team in the change process; implementation of an innovation strategy, a turnaround strategy, a transnational strategy, or an acquisition integration strategy. Elective for SCM.

MGMT 561 Global Strategy - Global Strategy is an elective course that focuses on the company in its international environment—its global strategy and the organizational and managerial arrangements it uses to pursue that strategy. Study how companies internationalize by analyzing a series of key corporate decisions: the decision to go international, whether or not to enter a particular market, how to enter a market, how to use expatriates and teams, how to integrate a cross-border acquisition, etc. Develop a global perspective that emphasizes broad, systemic thinking at four "levels" of analysis: the global economy as a whole, industries, national governments, and firms. Elective for SCM.

MGMT 597D Diversity Leadership - The leaders and organizations that will be most successful in the 21st century are those that build the capability to quickly adapt to changing marketplace conditions and leverage talent as a competitive advantage. Key to this organizational agility is the ability to manage diversity for organizational benefit. In this respect, diversity is much more than race and gender and managing diversity has more to do with accessing and leveraging a broad array of perspectives than ensuring compliance with EEO regulations or Affirmative Action Plans. Managing diversity is about creating an environment that enables diverse perspectives and ideas to surface and developing the skills to determine which ideas can best contribute to accomplishing business objectives. OPEN ELECTIVE

MKTG 533 Business Marketing - The creation, measurement and delivery of superior customer value in business markets is the focus of this course. Successful market-focused business-to-business (B2B) organizations know the importance of linking customer needs to the development of high value products throughout the value chain in a global, electronic environment. And those successful organizations require that marketing be viewed as an investment, with measurable results and not as an expense. Elective for SCM.

MKTG 542 New Product Development - The course has two objectives. The first objective is to expose the students to the various tools needed in NPD and to familiarize the students with the NPD process (market opportunity identification, customer analysis, concept generation, selection and testing, prototyping, launch and product life cycle management). The capstone of this is a team project that gives the students an opportunity to practice these process/tools discussed in the classroom. The second aim is

to help students understand and tackle some key NPD challenges facing senior management and management consultant. Elective for SCM.

SCM 540 Transportation in Supply Chain - This course provides knowledge of the internal and external components of transportation systems, including their technological features, operational processes, network configurations, and cost conditions. Alternative buyer-seller channels for domestic and international transportation service, and transportation service transaction processes, are identified and evaluated from strategic, tactical, and economic perspectives. Organizational alternatives and issues for the integration of transportation management and operational processes in supply chain systems also receive attention. Elective for SCM.

SCM 546 Strategic Procurement - This course explores leveraging the contributions of a supply strategy, e-procurement, supply segmentation, collaboration & relationship management, and global procurement for developing and executing sourcing strategies, with special emphasis on the strategic planning and use of information technology. This is one of three foundation courses. Required SCM

SCM 556 - Manufacturing Strategy - Focuses on understanding the connections between manufacturing, inventory, and location decisions on customer-focused, multi-stage supply chains. We will explore how strategic choices (such as information technology, facility location, and mass customization) tie in with planning decisions (such as forecasting and aggregate planning) to support synchronized supply chains. This is one of three foundation courses. Delivery is coordinated with BA 510. Evaluation methods include a combination of class participation, exams, "hands-on" exercises, case studies, and reactions papers. Required for SCM.

SCM 570 Supply Chain Modeling - Supply Chain Modeling focuses on mathematical modeling techniques used to design, analyze, execute and integrate supply chains. Three primary methods will be studied: simulation, optimization and enterprise resource planning. Key conceptual and theoretical methods will be reviewed, along with the use of complementary, contemporary software in each of the three major areas. Elective for SCM.

SCM 576 Logistics & Supply Chain Leadership - This capstone course is designed to integrate course topics covered in foundation courses and engage students in probing discussions of critical supply chain leadership issues. Special emphasis is given to supply chain technology adoption, change management, shareholder value assessment, capability assessment, relationship management, and performance metrics. Offered once per year in the spring semester. Evaluation methods include class participation, an intensive case project in the field, and a case competition judged by a panel of senior executives. Required for SCM portfolio.

SCM 597 Immersion - Using an appropriate pedagogical approach including but not limited to experiential, case based or problem based learning, this course is intended to

support offering coverage of topics or special interest subjects. Required for SCM primary portfolio

Source All PSU Courses: <http://www.smeal.psu.edu/mba/courses.html>

Unranked Schools:

Appendix J: Curriculum for Wright State University – Masters of Science in Logistics Management with concentration in Supply Chain Management

Wright States Program consists of 10 four quarter hour courses. Courses are:

MS 788 Basics Of Supply Chain Management - This course explores the fundamentals of supply chain management with a special emphasis on the strategic role of the supply chain, key drivers of supply chain performance, and analytical tools and techniques for supply chain analysis. The course describes supply chain methodologies and discusses levers and strategies to improve supply chain performance.

MS 790 Demand Management And Forecasting - This course addresses current issues of demand management and forecasting as they relate to the supply chain environment. It begins with specific forecasting methodologies, their appropriateness for use with different types of data and environments, and methods for measuring accuracy. It then discusses special event forecasting and ways to integrate managerial knowledge with statistical forecasting methods in order to increase responsiveness and improve accuracy. Specific software issues in forecasting and demand management, and sales and production planning are also reviewed. Current topics such as CPFR, accurate response, and the role of data mining, POS and CRM data in improving forecast accuracy are discussed.

MS 791 Benchmarking & Performance Metrics - This course focuses on the selection, use, and evaluation of appropriate metrics for supply chain performance, the benchmarking process, and the Baldrige Criteria for organization assessment. Sample topics include how to select appropriate performance metrics for an organization, how to develop and implement a scorecard to monitor organizational performance, how to link the scorecard to other systems within the organization, how to develop actions and initiatives to reach performance targets, how to identify "best practices," and how to apply the Baldrige Award criteria to internal operations.

MS 792 Supply Chain Network Design - This course studies models that explore the key issues associated with the design and management of supply networks. Special attention will be given to the integration of supply chain decisions and consequential difficulties. A considerable portion of the course is devoted to models that treat uncertainty explicitly. Topics include supply network design, inventory centralization, multistage production systems, the value of information, and contracts.

MS 793 Inventory Management - This course explores the fundamentals of inventory management, including continuous replenishment, ordering policies, measuring global and chain inventory, inventory positioning within the chain, and risk pooling. The objectives of the course are to understand strategies for reducing inventories, factors that

lead to an increase in cycle inventory, the role of safety inventory to counter supply or demand uncertainty, and factors that influence the level of safety inventory.

MS 794 Lean Supply Chain Management - This course focuses on the development of lean supply chains within organizations. Topics covered will include value stream mapping of processes for efficient material and information flow, the Kaizen approach to continuous improvement, and the use of quality tools for process evaluation and improvement.

MS 795 Information Technology And Supply Chains - This course focuses on managing material and information including product design collaboration, demand planning and forecasting, inventory deployment, distribution system design, channel management, procurement, and logistics. It explores order fulfillment strategies and the impact of IT on distribution and back-end supply chain processes. It also examines strategies for enterprise and extraprise integration.

MS 796 Strategic Sourcing - This course explores current issues of strategic sourcing within organizations. It underscores the differences between tactical and strategic sourcing. Key issues of strategic sourcing will be addressed, including how to make sourcing decisions to support corporate strategy, outsourcing versus insourcing, supplier and vendor selection, managing a worldwide sourcing network, and negotiating and managing contracts.

MS 797 - Global Supply Chain Management Strategies - This course covers issues relating to global supply chain management and coordinating production plans across the world. Key issues of global operations and SCM will be addressed, including how to develop and manage an efficient and effective global supply chain. The course also discusses the development of a comprehensive global SCM strategy, including strategic planning for individual global operations. Also addressed are issues relating to cost/benefit analysis, transportation and physical distribution, global facility location, labor productivity differentials, tariffs and quotas, and cultural differences.

MS 798 Supply Chain Collaboration - This course addresses issues of managing entities in the supply chain for efficient information flow and collaborative decision-making. This includes managing cross-enterprise collaboration, developing a technology structure that enables sharing of information internally and externally, team management, intra-enterprise collaboration, building a collaborative supply chain, and dealing with issues of leadership and power.

MS 799 Supply Chain Project - Students will complete a comprehensive company-based supply chain project with documented results. Each student will have an individualized project. This is the hallmark of the program. The project may be assigned by the student's employer or may be created in coordination with a faculty member.

Source All WSU MS Logistics: <http://www.wright.edu/cgibin/catalog/grad.cgi?id=70>

Appendix K: Curriculum for North Dakota State University (Collaboration with U.S. Army), Masters in Military Logistics

Program is made up of 12 courses. The courses are:

TL711 Logistics Systems - Covers foundation material on topics critical to establishing effective supply chains. Topics include inventory theory, forecasting, aggregate planning, quality management and project management. Material is presented with appropriate military applications.

TL713 Global Value Chain Management - Provides an overview of supply chain theory with a focus on military applications. Covers the basics of supply chain management including processes within both the internal and external supply chains.

TL715 Enterprise Resource Planning - Covers material essential to the successful implementation of an ERP, addressing enterprise-wide functionality as well as required tactical functions such as project management and project planning, and provides an overview of implementation alternatives.

TL717 Transportation and Logistics - This course focuses on the operation and planning of freight transportation modes and facilities, and materials distribution. Topics include: railroad, highway, vessel, and air transportation; container logistics; terminals and cargo-handling; and military transportation.

TL719 Crisis Management and Homeland Security - Provides an integrated approach to crisis response and management within the contexts of military logistics and homeland security. Focus is on problems of natural, technological, civil hazards, and disasters. The role of technology is emphasized.

TL721 International Logistics Management - This course provides a coherent perspective on contemporary global logistics from raw materials through production to the customer. Addresses the roles of governments and intermediaries, international sourcing, and the application of local trade laws.

TL723 Advanced Supply-Chain Planning - Continues to develop the concepts introduced in TL713. Flexible supply chains are considered. By understanding both current capabilities and evolving needs of the enterprise, the appropriate modifications to the supply chain can be identified.

TL725 Technology Advances and Logistics - This course addresses the new technologies that help shape advanced logistics and the advantages that such technologies have brought to end users, suppliers, and a broad spectrum of related industries.

TL727 Organizational Change Management - Change management is the process of making either incremental improvements or radical changes to an organization's operations for the purpose of enhancing both organizational and individual effectiveness. A systems perspective and leadership implications are stressed.

TL729 Adaptive Planning in Logistics - Presents a systems view with a focus on how remote sensing technology enables sense and respond logistics. Topics include organizational structure, strategic alliances, programmed decision-making, supply-chain dynamics, and the value of information transparency.

TL731 Logistics Research Methods - This course covers key research concepts including: principles of scientific research; experimental, quasi-experimental, and observational studies; and continuous-dependent variable, discrete-choice, and network models. The focus is on applications and problem solving in logistics and transportation.

TL733 Military Case Studies in Logistics - This course will consist of case analysis based primarily on events from Operation Iraqi Freedom. Topics from courses within the military logistics curriculum are integrated into the cases.

Source All NDSU courses: <http://cpol.army.mil/library/train/mml-prog.html>

Appendix L: Matrix with Course Numbers

Ranking	1	2	5	6	6	8	9				
School	MIT	MSU	U of Penn	OSU	Purdue	ASU	PSU	WSU	NDSU/US Army	AFIT MS Log Mgmt	AFIT IDE Log Mgmt
Type of Degree	MEng Logistics	MS Log	MBA Ops Mgmt	MBA Ops & Log Mgmt	MBA Global SCM	MBA SCM	MBA SCM	MS Log	MML	MS Log Mgmt	MLM
Skill Sets											
Networking Computing	C/E (264,912)	C (877)	E (662,664, 660, 661)	C (MBA 871)	C (683)	C (SCM 515, 541, 591b)	C (523), E (570)	C (795)	C (715, 725, 731)	C (615, 590, 501)	C (615, 590, 501)
Globalization	E (220)	C (881)	C (602, 655)	E (M&L 830)	E (649, 667)	C (ECN 503, SCM 591c, 591d)	E (561)	C (797)	C (TL721)		
Finance/Cost Control	E (390)		C (620)	C (MBA 800, 810)	C (600, 610, 611) E (643, 690Z)	C (ACC 502 & 503,) C (SCM 532)	C (511, 521, 531)				
Logistic Center Operation	C (261, 272) E (201, 760, 762)	C (872, 873, 876)	C (631, 654)	C (MBA 859)	C (650, 659, 660) E (561, 667)	C (SCMs 502, 511, 551, 591a)	C (556) E (540)	C (793, 794)	C (TL 717)	C (617, 619, 621, 628, 629)	C (570,617) E(621)
Planning & Evaluation	C (290, 874)	C (876, 879)	E (656)	E (MGT 835)	E (590D)	C (SCM 521, 532, 587))	C (504)	C (790)	C (723)	E (630)	E (660)
Supply Chain Management	C (261,262)	C (870)	C (632)	E (M&L 885)	E (590Y, 561)	C (SCM 502)	C (510, 546, 576)	C (788, 792)	C (TL 711, 713, 723)	C (627)	C (627)
Quantitative analysis	E (067)	C (871)	C (621)	C (MBA 870)	C (670, 671)	C (QBA 502)	C (553)			C (525, 535)	C (525, 535)
Business Skills	C (356)	C (875)	C (654)	E (MGT 830)		C (SCM 551)	E (542)	C (791/798)		C (620, ORSC 542, ECON 520)	C (620, ORSC 542, ECON 520)

Appendix M: Short descriptions of the skills and academic subjects identified by logistics experts and researchers that were condensed into competencies.

Chen Y. J., Wang, J. S. and Wu Y. C. from the Department of Logistics Management, National Kaohsiung First University of Science & Technology, Taiwan used concept mapping to identify seven skill clusters for logistics managers including:

Networking/Computing, international trading/procurement, labor/customs/tax laws, finance/cost control, quantitative analysis, planning/evaluation, Logistics center operations. They indicate that though logistics managers are expected to have the basic logistics knowledge their expected to be focused on performance enhancement which places the following subjects as a top priority: international trading/procurement, labor/customs/tax laws, finance/cost control, quantitative analysis, planning/evaluation. Each of the seven clusters were incorporated into the integrated competencies with international trading/procurement, labor/customs/tax laws, finance/cost control, quantitative analysis, planning/evaluation receiving future priority indications (Chen and others, 2000).

Dr. Remko I. van Hoek, a professor in supply chain management at the Cranfield School of Management, surveyed 281 companies to determine the market relevant skills including Globalization of transport and logistics, reconfiguration of supply chain structures, cross-functional coordination, outsourcing issues, inventory management, integration of information flow and systems externally, integration of information flow and systems internally. Each of these skills were incorporated into the integrated competencies with integration of information flow and systems internally, inventory

management, cross-functional coordination receiving future priority indications (Van Hoek, 2001).

Clifford F. Lynch of C.F. Lynch & Associate is another firm believer that “the greatest challenge of the new millennium will be a need to increase logistical professionalism.” In his review of the history of the logistic career field he identified the need to be educated in the core such as inventory management, order processing, materials handling, and warehousing. He also identified the need for an education in the new IT affecting the logistics area, how the US markets are interacting in the growing global markets and the essential leadership issues including planning and team development. Each of these items were incorporated into the integrated competencies with integration of information technology and the global market receiving future priority indications (Lynch, 1998:1).

Stirling Lafrance, Jennifer Harrington and Oliver Costa from the Trent Applied Social Research conducted a Logistics Practitioner Salary and Recognition Survey in an effort to determine what was affecting progression and compensation for professional logisticians. They addressed areas including compensation, recruitment and retention and employability. In the employability area they identified that the “priority areas of understanding are; business skills, logistics skills, and management skills ... more emphasis must be placed on leadership skills” (Lafrance, 2005). They do address the importance of the technical knowledge and especially the Information Technology skills but tend to believe that the current trend is showing a shift from technical leaders back to the interpersonal focused leader who can provide vision and motivation for their organizations. Each of these items were incorporated into the integrated competencies

with the need for planning and evaluation leadership skills receiving future priority indications (Lafrance, 2005).

1st Lieutenant Thomas C. O'Malley's Thesis entitled A Study of the Educational Experience, And Managerial Performance Requirements for Preparing Logistics Commanders is slightly dated it did provide a useful list of what he called education dimensions. These dimensions were identified and ranked by military leaders from Logistics Group Commanders, Maintenance Commanders and Logisticians. The dimensions in rank order include Supply Theory, Contracting, Total Quality, Funding, Interpreting Data, Computers, Acquisition, Statistics, Accounting, and Economics. Each of these items were incorporated into the integrated competencies but the lack of significant statistical difference lead us to list any of the dimensions with priority indications (O'Malley, 1996).

Amrik S. Sohal, Department of Management, Faculty of Business and Economics, Monash University, Victoria, Australia and Brian D'Netto, Mt Eliza Business School, Melbourne, Victoria 3004, conducted research to "assess Logistics Managers' perceptions of their profession" to include education requirements (Sohal, 2004). They rank ordered the following academic subjects as being required for their current logistics position: Computer studies, logistics management, new technologies, business management, accounting and finance, and languages. Interestingly when they ranked the same subject in order of their importance in the future the subjects of logistics management and business management changed positions. With the exception of languages, each of these academic subjects were incorporated into the integrated

competencies with the top three computer studies, business management, new technologies, receiving future priority indications (Sohal, 2004).

M. Eric Johnson and David F. Pyke from *Tuck School of Business, Dartmouth College, Hanover, NH*, A Framework For Teaching Supply Chain Management with a study of the “curricula used by many top engineering and graduate business schools for courses in supply chain management” (Johnson and Pyke, 2000). Johnson and Pyke discuss the importance of the basics in logistics, manufacturing and marketing but press that the following core areas are critical to education that will allow success in supply chain management: location, transportation and logistics, inventory and forecasting, marketing and channel restructuring, sourcing and supplier management, information and electronic mediated environments, product design and new product introduction, service and after sales support, reverse logistics and green issues, outsourcing and strategic alliances, metrics and incentives, and global issues. Each of these academic subjects were incorporated into the integrated subject with supply chain management receiving a future priority indication (Johnson and Pyke, 2000).

Richard F. Poist, College of Business, Iowa State University, Ames, Iowa, USA
Carl A. Scheraga, School of Business, Fairfield University, Fairfield, Connecticut, USA,
and Janjaap Semeijn Faculty of Economics and Business Administration, University of Maastricht, Maastricht, The Netherlands published the results of a questionnaire given to US and European logistics managers seeking their background and skill preferences considering the European Union changes. They found that the respondents placed management skills, especially communication skills, adaptability/flexibility and multi-functional capabilities at a much higher priority than technical skills. The following are

the skills sought by the leaders and their percentage in terms of the percentage of leaders who found the skill to be more important. Communication skills (84.6%), Adaptability/flexibility (80.4%), Multi-functional capabilities (i.e. versatility) (76.2%), Information systems and computer skills (73.2%), Foreign language proficiency/aptitude (70.1%), Leadership skills (68.1%), Interpersonal skills (67.0%), Management skills involving planning and control (62.9%), Functional/technical strengths (39.2%), Technological literacy (39.2%), Quantitative skills (39.2%), Statesmanship/governmental relations skills (38.1%), Documentation proficiency (29.9%). Each of these academic subjects were incorporated into the integrated subject with communication skills, adaptability/flexibility and multi-functional capabilities receiving future priority indications (Poist, 2000).

Managing Logistics study of how senior management compensates Logistics professionals looked at skills, education and responsibly as it relates to salary. For our study we focused on the skills that leaders found important for logistics managers. Senior leaders focused on technical skills, computer capabilities and systems knowledge. Each of these academic subjects were incorporated into the integrated competencies (Managing Logistics, 2000).

Dr. John T. Mentzer, Chair of Excellence in Business in the Department of Marketing and Logistics at the University of Tennessee, wrote in his 2006 Executive Education Guide: Critical Skills for Effective Supply Chain Leaders that supply chain leaders must contain the basic business skills like finance, marketing, production, accounting, sales and procurement. More importantly, to be effective in the managed supply chain environment Dr. Mentzer believes a leader must master processes that flow

across organizations including have customer relationship management, procurement/supplier relations, operations/logistics management and process design. Each of these academic subjects were incorporated into the integrated subject with customer relationship management, procurement/supplier relations, operations/logistics management and process design receiving future priority indications (Mentzer, 2000).

In his article, How to develop the next generation of logistics experts, Perry Trunick discusses the need to improve the technical skills of leaders to “bridge the gap” between the core business knowledge gained in a type MBA program and add the critical optimization and computer logistics software and technology, simulation and warehouse facility design. Each of these academic subjects were incorporated into the integrated competencies with all three receiving future priority indications (Trunick, 2005).

While attending the School of Advanced Military Studies, Lieutenant Colonel Mark E. Solseth, U.S. Army Quartermaster, addressed the Army’s failure to educate officers on the key processes for military logistics in the future; Distribution and Supply Chain. He identified technological competence; analytical competence; and a broad understanding of the supply chain as core areas of competency to act as an effective distribution and supply chain manager. Each of these academic subjects were incorporated into the integrated competencies with all three receiving future priority indications (Solseth, 2005).

Vita

Major Todd L. Coleman graduated from Terry Parker High School in Jacksonville, Florida. He enlisted in the United States Air Force in December of 1986. While on active duty, he earned a Bachelor of Science degree in Professional Aeronautics from Embry-Riddle Aeronautical University in 1993. In May of 1994, he graduated as a Distinguished Graduate from Officers Training School and received his commission. He earned a Masters of Education degree in 2003 from the University of Louisville.

His most recent assignment was at Davis-Monthan AFB, Tucson, Arizona. While assigned to Davis-Monthan he work at Headquarters Twelfth Air Force and his culminating position was as Executive Officer to the Commander, Twelfth Air Force. After three years at Twelfth Air Force he was reassigned as the Operations Officer in the 355th Logistics Readiness Squadron. While the assigned to the 355 Logistics Readiness Squadron he deployed for four months as Commander, 506th Expeditionary Logistics Readiness Squadron, Kirkuk AB, Iraq. Upon his return from Iraq he was the acting commander for five months. Major Coleman has had assignments in Germany, Florida, North Dakota, Guam, and at a Air Force ROTC unit in Louisville, Kentucky. In May 2005, he entered the Intermediate Developmental Education program at the Graduate School of Engineering and Management, Air Force Institute of Technology. Upon graduation, he will be assigned to the Air Force Institute of Technology's School of Systems and Logistics, Kettering, Ohio.

Major Jerry Stonecipher graduated from Widefield High School in Widefield, Colorado. Upon graduation, he enlisted in the United States Air Force in December 1987. He received numerous accolades during his enlisted career to include 66th Electronic Combat Wing Airman of the Year, 1991, and the NCO Preparatory John L. Levitow Award. In 1993, while serving at the Royal Air Force Upper Heyford, United Kingdom, he earned a Bachelor degree in Information Systems Management from the University of Maryland. In May of 1994, he graduated as a Distinguished Graduate from Officers Training School and received his commission. He earned a Masters of Science in Organizational Development from The George Washington University in 2002.

His most recent assignment was at Nellis AFB, Nevada. In May 2002, Major Stonecipher took command of the 98th Logistics Readiness Squadron, 98th Range Wing, Nellis Air Force Base, Nevada. He commanded a unique unit with 280 military, contractor and civil service personnel providing logistic and security support to the 2.9M acre Nevada Test and Training Range as well as Civil Engineering and Services to the Northern Ranges and Tonopah Test Range. Major Stonecipher oversaw base operating support for F/A-22 testing, Red Flags, and SECDEF-directed Joint Test programs. He certified joint combat forces prior to Operations ENDURING and IRAQI FREEDOM by providing an unrivalled venue for nine classified combat rehearsals that according to the AOR CC, “saved special operator lives.” In May 2005, he entered the Intermediate Developmental Education program at the Graduate School of Engineering and Management, Air Force Institute of Technology. Upon graduation, he will be assigned to the Air Force Institute of Technology’s School of Systems and Logistics, Kettering, Ohio.

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